Start Calculation!

Teacher Manual Class-7

Future Print

Chapter-1

Exercise-1.1

1. Write the name of properties:

(a) Closure property of addition
(b) Commutative property of addition
(c) Associative property of addition
(d) 0 is additive identity

2. Write the additive inverse of the following integers:

(a) – 24 (b) 0 (c) 18
(d) 75 (e) –16

3. Write the additive inverse of the following integers:

(a) 25 + (–5)
= 25 – 5 = 20
(b) (–80) + (–20)
= –80 – 20 = – 100
(c) (+100) + (–20)
= 100 – 20 = 80
(d) (+60) + (–60)
= 60 – 60 = 0
(e) (–20) + 0
= – 20 + 0 = – 20
(f) (–20) + (–20)
= – 20 – 20 = – 40

4. Find the sum of the following integers:

(a) 132 + (–502)
= 132 – 502 = – 370
(b) 168 + (–272)
= 168 – 272 = –104
(c) (–352) + 250
= –352 + 250 = – 102
(d) 255 + 622 + (– 102)
= 255 + 622 – 102
= 877 – 102 = 775
(e) – 500 + (–250) + 882
= – 500 – 250 + 882
= – 750 + 882 = 132

5. Fill in the blanks:

(a) – 252 (b) –200 (c) –850
(d) 0

6. Let the number be x:

$x = -19 - 60$
$= x - 79$
The other number is – 79

7. Let the third number be x:

$x + (-17) + (-20) = 60$
$x - 17 - 20 = 60$
$x - 37 = 60$
$x = 60 + 37$
$x = 97$
The third number is 97

8. Let $a = 10, b = 7$ and $c = -12$ show that:

(a) $a + b = b + a$
10 + 7 = 7 + 10
17 = 17 Hence Proved
(b) $b + c = c + b$
7 + (–12) = (–12) + 7
7 – 12 = – 12 + 7
– 5 = – 5 Hence Proved
(c) $a + c = c + a$
10 + (–12) = – 12 + 10
10 – 12 = – 12 + 10
– 2 = – 2 Hence Proved
(d) $(a + b) + c = a + (b + c)$
(10+ 7) + (–12) = 10 + (7 + (–12))
17 – 12 = 10 + (–5)
5 = 5 Hence Proved

9. 0

Exercise-1.2

1. Subtract the following:

(a) 45 – (–70)
= 45 + 70 = + 115

(b) $90 - (-82)$
$= 90 + 82 = 172$
(c) $(-80) - (-50)$
$= -80 + 50 = -30$
(d) $0 - (-50)$
$= 0 + 50 = 50$
(e) $(-70) - (-70)$
$= -70 + 70 = 0$

2. Evaluate the following:
(a) $15 - (-7)$
$= +15 + 7 = 22$
(b) $(-18) - 10$
$= -18 - 10 = -28$
(c) $-8 - (-24)$
$= -8 + 24 = 16$
(d) $20 - (+7)$
$= 20 - 7 = 13$
(e) $(-50) - (50)$
$-50 - 50 = -100$

3. $(-18) + (-19)$
$= -18 - 19 = -37$
$(-20) + 30 = 10$
The difference of -37 and 10 is
$= -37 - 10 = -47$

4. The other number be x:
$x + 5 = -18$
$x = -18 - 5 \quad = x = -23$
The other number is -23

5. The sum of (–50) and (–60) is
$= -50 + (-60)$
$= -50 - 60 = -110$
-110 subtract from 110
$-110 - 110$

6. The sum of (-80) and 60 is
$= -80 + 60 = -20$
Subtract (-56) from (-20)
$= -20 - (-56)$
$= -20 + 56 = 36$

7. The third integer be x:
$x + 35 + (-65) = -118$
$x + 35 - 65 = -118$
$x + 35 = -118 + 65$
$x + 35 = -53$
$x = -53 - 35 \qquad x = -88$
The third integer is -88

8. Which one is greater:
(a) $(-58) - 60$
$= -118 \;= 58 - 60 = -2$
$(-58) - 60 < 58 - 60$
(b) $0 + (-70)$
$= 0 - 70 = -70$
$= (-70) + 70 = 0$
$= 0 + (-70) < (-70) + 70$
(c) $22 + (-20) = 2$
$= -40 - (-40)$
$= -40 + 40 = 0$
$22 + (-20) > (-40) - (-40)$
(d) $(-2 - 2 - 2)$
$= -4 - 2 = -6$
$(2 + 2 + 2) = 6$
$(-2 - 2 - 2) < (2 + 2 + 2)$

9. Let $a = -17, b = 8$ and $c = -6$ verify the following:
(a) $a - b \neq b - a$
$(-7) - 8 \;= 8 - (-7)$
$-15 \neq 15$ Hence Proved
(b) $b - c \neq c - b$
$8 - (-6) = -6 - 8$
$14 \neq -14$ Hence Proved
(c) $a - c \neq c - a$
$(-7) - (-6) = (-6) - (-7)$
$-7 + 6 = -6 + 7$
$-1 \neq 1$ Hence Proved
(d) $(a - b) - c \neq a - (b - c)$
$(-7 - 8) - (-6) = -7 - (8 - (6))$
$-15 + 6 = -7 - (8 + 6)$
$-15 + 6 = -7 - 14$
$-9 \neq -21$ Hence Proved

Exercise-1.3

1. Writ the name of properties:
(a) Closure property of multiplication.
(b) Commutative property of multiplication
(c) Associative property of multiplication
(d) Distributive property of multiplication over addition

2. Write the multiplicative inverse each of the following:

(a) $\frac{1}{7}$ (b) $-\frac{1}{24}$

(c) Does not exist

(d) $\frac{1}{200}$ (e) $\frac{-1}{450}$

3. Find the product:

(a) $5 \times 7 = 35$

(b) $15 \times (-2) = -30$

(c) $(-10) \times (-5) = 50$

(d) $(-30) \times 0 = 0$

(e) $(-18) \times (-5) = 90$

(f) $(-25) \times (6) = -150$

4. Find the product by using associative property:

(a) $4 \times (-2) \times 5$
$= = -8 \times 5 = -40$

(b) $(-3) \times (-2) \times 5$
$= 6 \times 5 = 30$

(c) $(-2) \times (-7) \times (-9)$
$= 14 \times (-9) = -126$

(d) $10 \times 2 \times 4$
$= 20 \times 4 = 80$

(e) $(-6) \times 8 \times (-7)$
$= -48 \times (-7)$
$= + 336$

5. Find the product:

(a) $(-4) \times (-5) \times (-7)$
$= 20 \times (-7) = -140$

(b) $(-5) \times (-9) \times (-6) \times (-5)$
$= 45 \times 30 = 1350$

(c) $(-2) \times (-10) \times (-5) \times (-1) \times (-2)$
$= 20 \times (-5) \times (-1) \times (-2)$
$= -100 \times (-1) \times (-2)$
$= 100 \times (-2) = -200$

(d) $(-3)\times(-8)\times(-2)\times(-2)\times(-3)\times(-2)$
$= 24 \times 4 \times 6 = 576$

6. Product of (–9) and (–8):

$= -9 \times (-8) = 72$

Product of (–4) and (–7)

$= (-4) \times (-7) = 28$

Sum of 72 and 28

$= 72 + 28 = 100$

7. Product of (–12) and (–6):

$= -12 \times (-6) = 72$

Product of (–8) and 5

$= -8 \times 5 = -40$

Difference of 72 and –40

$= 72 - (-40)$

$= 72 + 40 = 112$

8. Find the sign of product if:

(a) Negative (b) Positive (c) Positive

(d) Positive

9. Let $a = -2, b = 3, c = -4$ and verify the following:

(a) $a \times b = b \times a$
$= -2 \times 3 = 3 \times (-2)$
$= -6 = -6$ Hence Proved

(b) $b \times c = c \times b$
$= 3 \times (-4) = (-4) \times 3$
$= -12 = -2$ Hence Proved

(c) $a \times c = c \times a$
$= -2 \times (-4) = (-4) \times (-2)$
$= 8 = 8$ Hence Proved

(d) $(a \times b) \times c = a \times (b \times c)$
$(-2 \times 3) \times (-4) = -2 \times (3 \times (-4))$
$= -6 \times (-4) = -2 \times (-12)$
$= 24 = 24$ Hence Proved

10. Fill in the blanks:

(a) –45 (b) –1 (c) –45, 64 (d) 0

(e) –525

11. Verify the following:

(a) $625 \times [100 - 2] = (625 \times 100) - (625 \times 2)$
$= 625 \times 98 = 2500 - 1250$
$= 61250 \neq 1250$ Hence Proved

(b) $(-560) \times [102 + 2] = [(-560) \times (-102)] + [(-560) \times 2]$
$= -560 \times 104 = 57120 + (-1120)$
$= 58240 \neq 56000$ Hence Verify

Exercise 1.4

1. Divide the following:

(a) 70 by 14
$= 70 \div 14 = 5$

(b) $-64 \div 8 = -8$

(c) $88 \div (-11) = -8$

(d) $-66 \div (-6) = 11$
(e) $-40 \div 1 = -40$
(f) $0 \div (-100) = 0$
(g) $(-80) \div (-80) = 1$
(h) $(-800) \div 40 = -20$
(i) $-500 \div 0 =$ Infinity
(j) $800 \div 40 = 20$
(k) $(-800) \div (-800) = 1$
(l) $800 \div 800 = 1$

2. Let $a = 4, b = -2$ and $c = 2$, verify the following:

(a) $a \div b \neq b \div a$
$= 4 \div (-2) = (-2) \div 4$
$= -2 \neq -0.5$ Hence Proved

(b) $b \div c \neq c \div b$
$= -2 \div 2 = 2 \div (-2)$
$= -1 = -1$ Hence Proved

(c) $a \div c \neq c \div a$
$= 4 \div 2 = 2 \div 4$
$= 2 \neq 0.5$ Hence Proved

(d) $(a \div b) \div c \neq a \div (b \div c)$
$(4 \div (-2)) \div 2 = 4 \div ((-2) \div 2)$
$= -2 \div 2 = 4 \div (-1)$
$= -1 \neq -4$ Hence Proved

3. Solved the following:

(a) $[(-2) \times (-8)] \div [(-2) \times 4]$
$= 16 \div (-8) = -2$

(b) $[(-5) \times 8] \div [(-8) \times 5]$
$= -40 \div (-40) = 1$

(c) $[(-8) \div 4] \times [16 \div (-4)]$
$= -2 \times (-4) = 8$

(d) $[(-2) + (-4)] \div [(-2) + (-1)]$
$= -6 \div -3 = 2$

(e) $[(-2) + (-4)] \div [(-2) + (-1)]$
$= 6 \div -3 = 2$

(f) $[16 + (-4)] \div [(-7) + 3]$
$= [12] \div [-4] = -3$

4. Let, the other integer be x
$= 4 \times x = -88$
$= x = -88 \div 4$
$= -22$

5. The sum of (–18) and (–6)
$= -18 + (-6)$
$= -18 - 6 = -24$
The sum of (–5) and 3
$= -5 + 3 = -2$
Divide $(-24) \div (-2) = -126$

6. Product of $(-12) \times 6 = -72$
Product of (–3) and 3
$= -3 \times 3 = -9$
Divide –72 and –9
$= -72 \div (-9) = 8$

7. Divide 300 by (–10)
$= 300 \div (-10) = -30$
Divide 400 by 20
$= 400 \div 20 = 20$
Sum of quotient
$= -30 + 20 = -10$

8. Subtract
$(-100) - (-80)$
$= -100 + 80 = -20$
Sum of (–25) and 5
$= -25 + -20$
Divide $(-20) \div (-20)$
$= -20 \div -20 = 1$

9. Fill in the blanks:
(a) –1 (b) 0 (c) –85 (d) No meaning
(e) –600 (f) –80

10. Simplify:

$$= \frac{[(-12) \div 2] \times [(-15) \div (-3)]}{[(-8) - (-2)] \div [(-5) \div (-1)]}$$

$$= \frac{-6 \times 5}{-6 \times 5} = \frac{-30}{-30} = 1$$

MCQs (Mental Ability)

1. Positive **2.** Positive **3.** 1 **4.** 0 **5.** 3

NCERT CORNER

Fill in the blanks:

1. Positive **2.** Positive **3.** Positive
4. Odd **5.** 1

True or False:

1. True **2.** False **3.** False **4.** False
5. False

Chapter-2

Exercise-2.1

1. Write the fraction in which:

(a) $\frac{5}{11}$ (b) $\frac{7}{12}$

2. Convert the following fractions into mixed fractions:

(a) $3\frac{1}{8}$ (b) $9\frac{5}{8}$ (c) $6\frac{9}{10}$ (d) $5\frac{5}{6}$

(e) $9\frac{9}{11}$

3. Convert the following mixed fractions into improper fractions:

(a) $\frac{33}{4}$ (b) $\frac{32}{3}$ (c) $\frac{60}{7}$ (d) $\frac{67}{7}$ (e) $\frac{305}{3}$

4. Write three equivalent fractions to the following fractions by multiply numerator and denominator:

(a) $\frac{1}{2}$

$\frac{1}{2}\times\frac{2}{2}=\frac{2}{4}\Rightarrow\frac{1}{2}\times\frac{3}{3}=\frac{3}{6}$

$\frac{1}{2}\times\frac{4}{4}=\frac{4}{8}$ $\quad\frac{2}{4},\frac{3}{6},\frac{4}{8}$

(b) $\frac{2}{3}$

$\frac{2}{3}\times\frac{2}{2}=\frac{4}{6}\Rightarrow\frac{2}{3}\times\frac{2}{2}=\frac{6}{9}$

$\frac{2}{3}\times\frac{4}{4}=\frac{9}{12}$ $\quad\therefore\frac{4}{6},\frac{6}{9},\frac{9}{12}$

(c) $\frac{3}{5}$

$\frac{3}{5}\times\frac{2}{2}=\frac{6}{10}\Rightarrow\frac{3}{5}\times\frac{3}{3}=\frac{9}{15}$

$\frac{3}{4}\times\frac{4}{4}=\frac{12}{20}$ $\quad\therefore\frac{6}{10},\frac{9}{15},\frac{12}{20}$

(d) $\frac{4}{5}$

$\frac{4}{5}\times\frac{2}{2}=\frac{8}{10}\Rightarrow\frac{4}{5}\times\frac{3}{3}=\frac{12}{15}$

$\frac{4}{5}\times\frac{4}{4}=\frac{16}{20}$ $\quad\therefore\frac{8}{10},\frac{12}{15},\frac{16}{20}$

(e) $\frac{5}{8}$

$\frac{5}{8}\times\frac{2}{2}=\frac{10}{16}\Rightarrow\frac{5}{8}\times\frac{3}{3}=\frac{15}{24}$

$\frac{5}{8}\times\frac{4}{4}=\frac{20}{32}$ $\quad\therefore\frac{10}{16},\frac{15}{24},\frac{20}{32}$

5. Write three equivalent fractions to the following fractions by divide numerator denominator:

(a) $\frac{60}{80}$

$\frac{60}{80}\div\frac{2}{2}=\frac{30}{40}\Rightarrow\frac{60}{80}\div\frac{4}{4}=\frac{15}{20}$

$\frac{60}{80}\div\frac{5}{5}=\frac{12}{16}$ $\quad\therefore\frac{30}{40},\frac{15}{20},\frac{12}{16}$

(b) $\frac{100}{90}$

$\frac{100}{90}\div\frac{2}{2}=\frac{50}{45}\Rightarrow\frac{100}{90}\times\frac{5}{5}=\frac{20}{18}$

$\frac{100}{90}\div\frac{10}{10}\times\frac{10}{9}$ $\quad\therefore\frac{50}{45},\frac{20}{18},\frac{10}{9}$

(c) $\frac{120}{150}$

$\frac{120}{150}\div\frac{2}{2}=\frac{60}{75}\Rightarrow\frac{120}{150}\div\frac{3}{3}=\frac{40}{50}$

$\frac{120}{150}\div\frac{5}{5}=\frac{24}{30}$ $\quad\therefore\frac{60}{75},\frac{40}{50},\frac{24}{30}$

(d) $\frac{200}{100}$

$\frac{200}{100}\div\frac{2}{2}=\frac{100}{50}\Rightarrow\frac{200}{100}\div\frac{4}{4}=\frac{50}{25}$

$\frac{200}{100}\div\frac{5}{5}=\frac{40}{20}$ $\quad\therefore\frac{100}{50},\frac{50}{25},\frac{40}{20}$

(e) $\frac{1000}{500}$

$\frac{1000}{500}\div\frac{2}{2}=\frac{500}{250}\Rightarrow\frac{1000}{500}\div\frac{4}{4}=\frac{250}{120}$

$\frac{1000}{500}\div\frac{2}{2}=\frac{200}{100}$ $\quad\therefore\frac{500}{250},\frac{250}{125},\frac{200}{100}$

6. Write the following fraction into simple form:

(a) $\frac{150}{130}$ $\quad\frac{150}{130}=\frac{15}{13}$

(b) $\frac{89}{28}$ $\quad\frac{89}{28}$

(c) $\frac{75}{30}$ $\quad\frac{75}{30}=\frac{5}{2}$

(d) $\frac{85}{60}$ $\quad\frac{85}{60}=\frac{17}{12}$

(e) $\frac{210}{70}$ $\quad\frac{210}{70}=\frac{3}{1}$

7. Which fraction is greater:

(a) $\frac{2}{3} or \frac{3}{5}$

L.C.M. of 3, 5 is 15

$\frac{2\times5}{3\times5}=\frac{10}{15} \quad \Rightarrow \frac{3\times3}{5\times3}=\frac{9}{15}$

$=\frac{2}{3}>\frac{3}{5}$

(b) $\frac{12}{15} or \frac{6}{5}$

L.C.M. of 15 and 5 is 15

$\frac{12\times1}{15\times1}=\frac{12}{15} \quad \Rightarrow \frac{6\times3}{5\times3}=\frac{18}{15}$

$\frac{12}{15}<\frac{6}{5}$

(c) $\frac{8}{9} or \frac{3}{36}$

L.C.M. pf 9 and 36 is 36

$\frac{8\times4}{9\times4}=\frac{32}{36} \quad \Rightarrow \frac{3\times1}{36\times1}=\frac{3}{36}$

$\frac{8}{9}>\frac{3}{36}$

(d) $\frac{3}{5} or \frac{18}{30}$

L.C.M. of 5 and 30 is 30

$\frac{3\times6}{5\times6}=\frac{18}{30} \quad \Rightarrow \frac{18\times1}{30\times1}=\frac{18}{30}$

They both are equal.

8. Which fraction is smaller:

(a) $\frac{2}{9} or \frac{6}{7}$

L.C.M. 9 and 7 is 63

$\frac{2\times7}{9\times7}=\frac{14}{63} \quad \Rightarrow \frac{6\times9}{7\times9}=\frac{54}{63}$

$\frac{14}{63}<\frac{54}{63}$

(b) $\frac{3}{8} or \frac{6}{10}$

L.C.M. of 8 and 10 is 40

$\frac{3\times5}{8\times5}=\frac{15}{40} \quad \Rightarrow \frac{6\times4}{10\times4}=\frac{24}{40}$

$\frac{15}{40}<\frac{24}{40}$

(c) $\frac{5}{7} or \frac{7}{5}$

L.C.M. of 7 and 5 is 35

$\frac{5\times5}{7\times5}=\frac{25}{35} \quad \Rightarrow \frac{7\times7}{5\times7}=\frac{49}{35}$

$\frac{25}{35}<\frac{49}{35}$

(d) $\frac{8}{17} or \frac{9}{34}$

L.C.M. of 17 and 34 is

$\frac{8\times2}{17\times2}=\frac{16}{34} \quad \Rightarrow \frac{9\times1}{34\times1}=\frac{9}{34}$

$\frac{16}{34}>\frac{9}{34}$

9. Write the following fractions in increasing order:

(a) $\frac{16}{11},\frac{5}{11},\frac{2}{11},\frac{18}{11},\frac{4}{11}$

$\frac{2}{11}<\frac{4}{11}<\frac{5}{11}<\frac{16}{18}<\frac{18}{11}$

(b) $\frac{2}{15},\frac{2}{9},\frac{2}{3},\frac{2}{11},\frac{2}{17}$

$\frac{2}{17}<\frac{2}{15}<\frac{2}{11}<\frac{2}{9}<\frac{2}{3}$

(c) $\frac{2}{3},\frac{5}{5},\frac{7}{12},\frac{1}{4},\frac{1}{24}$

L.C.M. of 3, 5, 12, 4 and 24 is 120

$=\frac{2\times40}{3\times40},\frac{5\times24}{5\times24},\frac{7\times10}{12\times10},\frac{1\times30}{4\times30},$

$\frac{1\times5}{24\times5}$

$=\frac{80}{120},\frac{120}{120},\frac{70}{120},\frac{30}{120},\frac{5}{120}$

$=\frac{5}{120}<\frac{30}{120}<\frac{70}{120}<\frac{80}{120}<\frac{120}{120}$

$\therefore \frac{1}{24}<\frac{1}{4}<\frac{7}{12}<\frac{2}{3}<\frac{5}{5}$

(d) $\frac{4}{16},\frac{2}{4},\frac{5}{4},\frac{3}{2},\frac{9}{4}$

L.C.M. of 16, 4, 4, 2 and 4 is 16

$=\frac{4\times1}{16\times1},\frac{2\times4}{4\times4},\frac{5\times4}{4\times4},\frac{3\times8}{2\times8},\frac{9\times4}{4\times4}$

$=\frac{4}{16},\frac{8}{16},\frac{20}{16},\frac{24}{16},\frac{36}{16}$

$=\frac{4}{16}<\frac{8}{16}<\frac{20}{16}<\frac{24}{16}<\frac{24}{16},\frac{36}{16}$

$\therefore \frac{4}{16}<\frac{2}{4}<\frac{5}{4}<\frac{3}{2}<\frac{9}{4}$

10. Write the following fractions in deceasing order:

(a) $\frac{5}{7}, \frac{11}{7}, \frac{6}{7}, \frac{13}{7}, \frac{15}{7}$

$= \frac{5}{7} < \frac{6}{7} < \frac{11}{7} < \frac{13}{7} < \frac{15}{7}$

(b) $\frac{4}{9}, \frac{4}{11}, \frac{4}{2}, \frac{4}{5}, \frac{4}{14}$

$= \frac{4}{2} < \frac{4}{5} < \frac{4}{9} < \frac{4}{11} < \frac{4}{14}$

(c) $\frac{2}{7}, \frac{9}{14}, \frac{11}{14}, \frac{14}{56}, \frac{13}{28}$

L.C.M. of 7, 14, 14, 56 and 28 is 56

$= \frac{2\times8}{7\times8}, \frac{9\times4}{14\times4}, \frac{11\times4}{14\times4}, \frac{14\times1}{56\times1}, \frac{13\times2}{28\times2}$

$= \frac{16}{56}, \frac{36}{56}, \frac{44}{56}, \frac{14}{56}, \frac{26}{56}$

$= \frac{14}{56} < \frac{14}{56} < \frac{26}{56} \frac{36}{56} < \frac{44}{56}$

$\therefore \frac{14}{56} < \frac{2}{7} < \frac{13}{28} < \frac{9}{14} < \frac{11}{14}$

(d) $\frac{9}{12}, \frac{6}{24}, \frac{5}{48}, \frac{1}{24}, \frac{3}{24}$

L.C.M. of 12, 24, 48, 24 and 24 is 48

$= \frac{9\times4}{12\times4}, \frac{6\times2}{24\times2}, \frac{5\times1}{48\times1}, \frac{1\times2}{24\times2}, \frac{3\times2}{24\times2}$

$= \frac{36}{48}, \frac{12}{48}, \frac{5}{48}, \frac{2}{48}, \frac{6}{48}$

$= \frac{2}{48} < \frac{5}{48} < \frac{6}{48} < \frac{12}{48} < \frac{36}{48}$

$\therefore \frac{1}{24} < \frac{5}{48} < \frac{3}{24} < \frac{6}{24} < \frac{9}{12}$

11. Add the following:

(a) $\frac{4}{9} + \frac{5}{18}$ L.C.M. of 9 and 18 is 18

$= \frac{8+5}{18} = \frac{13}{18}$

(b) $\frac{10}{7} + \frac{3}{4}$ L.C.M. of 7 and 4 is 28

$= \frac{40+21}{28} = \frac{61}{28}$

(c) $\frac{1}{6} + \frac{5}{18}$ L.C.M. of 6 and 18 is 18

$= \frac{3+5}{18} = \frac{8}{18}$

(d) $\frac{8}{15} + \frac{9}{45}$

L.C.M. of 15 and 45 is 45

$= \frac{24+9}{45} = \frac{33}{45}$

(e) $4\frac{3}{4} + 5\frac{4}{18} + 2\frac{1}{15} = \frac{19}{4} + \frac{94}{18} + \frac{31}{15}$

L.C.M. of 4, 18 and 15 is 180

$= \frac{855+940+372}{180} = \frac{2167}{180}$

(f) $1\frac{3}{4} + \frac{21}{8} + 4\frac{1}{16} = \frac{7}{4} + \frac{17}{8} + \frac{65}{16}$

$= \frac{252+306+585}{144} = \frac{1143}{144}$

(g) $4\frac{1}{3} + 1\frac{1}{6} + 2\frac{1}{5} = \frac{13}{3} + \frac{7}{6} + \frac{11}{5}$

$= \frac{130+35+66}{30} = \frac{221}{30}$

(h) $18\frac{1}{2} + 1\frac{1}{3} + \frac{1}{4} = \frac{37}{2} + \frac{4}{3} + \frac{1}{4}$

$= \frac{222+16+3}{12} = \frac{241}{12}$

12. Subtract the following:

(a) $\frac{3}{11} - \frac{1}{11}$ L.C.M. of 11 and 11 is 11

$= \frac{3-1}{11} = \frac{2}{11}$

(b) $\frac{8}{15} - \frac{2}{15}$ L.C.M. of 15 and 15 is 15

$= \frac{8-2}{15} = \frac{6}{15} = \frac{2}{5}$

(c) $\frac{17}{21} - \frac{15}{21}$ L.C.M. of 21 and 21 is 21

$= \frac{17-15}{21} = \frac{2}{21}$

(d) $5 - 2\frac{3}{4} = \frac{5}{1} - \frac{11}{4}$

L.C.M. of 1, 4 is 4

$= \frac{20-11}{4} = \frac{9}{4}$

(e) $6\frac{3}{4} - 4\frac{1}{6} = \frac{27}{4} - \frac{25}{6}$

L.C.M. of 4 and 6 is 12

$= \frac{81-50}{12} = \frac{31}{12}$

(f) $\frac{3}{10} - 2\frac{6}{7} \qquad = \frac{33}{10} - \frac{20}{7}$

L.C.M. of 7 and 10 is 70

$= \frac{231-200}{70} = \frac{31}{70}$

(g) $14\frac{1}{8} - 3\frac{3}{10} \qquad = \frac{113}{8} - \frac{33}{10}$

L.C.M. of 8 and 10 is 40

$= \frac{565-132}{40} = \frac{433}{40}$

(h) $5\frac{1}{7} - 3\frac{5}{6} \qquad = \frac{36}{7} - \frac{23}{6}$

L.C.M. of 4 and 6 is 42

$= \frac{216-161}{42} = \frac{55}{42}$

13. Simplify the following:

(a) $\frac{5}{11} + \frac{8}{11} - \frac{2}{11}$

L.C.M. of 11, 11 and 11 is 11

$= \frac{5+8-2}{11} = \frac{13-2}{11} = \frac{11}{11} = 1$

(b) $\frac{6}{13} - \frac{3}{13} + \frac{7}{13}$

L.C.M. of 13, 13 and 13 is 13

$= \frac{6-3+7}{13} = \frac{3+7}{13} = \frac{10}{13}$

(c) $10 - 3\frac{1}{5} - 5\frac{3}{10} \qquad = \frac{10}{1} - \frac{16}{5} - \frac{53}{10}$

L.C.M. of 1, 5 and 10 is 10

$= \frac{100-32-53}{10} = \frac{68-53}{10} = \frac{15}{10}$

(d) $4\frac{1}{2} - 2\frac{3}{4} - 1\frac{1}{4} \qquad = \frac{9}{2} - \frac{11}{4} - \frac{5}{4}$

L.C.M. of 2, 4and 4 is 4

$= \frac{18-11-5}{4} = \frac{7-5}{4} = \frac{3}{4}$

(e) $7\frac{3}{4} + 6\frac{1}{2} - 5\frac{1}{2} - 6\frac{3}{8}$

$= \frac{31}{4} + \frac{13}{2} - \frac{11}{2} - \frac{51}{8}$

L.C.M. of 4, 2, 2 and 8 is 8

$= \frac{62+52-11-51}{8} = \frac{114-11-51}{8}$

$= \frac{103-51}{8} = \frac{52}{8}$

(f) $\frac{4}{9} - \frac{5}{12} + \frac{1}{2}$

L.C.M. of 9, 12 and 2 is 36

$= \frac{16-15+18}{36} = \frac{1+18}{36} = \frac{19}{36}$

14. Let the other number be x

$2\frac{1}{8} + x = 13\frac{1}{4}$

$= \frac{17}{8} + x = \frac{53}{4} \qquad = x = \frac{53}{4} - \frac{17}{8}$

L.C.M. of 4 and 8 is 8

$x = \frac{106-17}{8} \qquad x = \frac{89}{8}$

15. Let the number number be x

$8\frac{1}{4} + x = 11$

$x = 11 - 8\frac{1}{4} \qquad x = \frac{11}{1} - \frac{33}{4}$

L.C.M. of 1 and 4 is 4

$x = \frac{44-33}{4} \qquad x = \frac{11}{4}$

16. A film show lasted = $3\frac{1}{4}$ hrs

$= \frac{13}{4}$ hrs

Hours spent on advertisement $= \frac{2}{3}$ hr

Duration of film $= \frac{13}{4} - \frac{2}{3}$

$= \frac{39-8}{12} = \frac{31}{12}$ hrs

Exercise-2.2

1. Find the value of the following:

(a) $\frac{1}{4}$ of 72 $\qquad = \frac{1}{4} \times 72 = 18$

(b) $\frac{1}{4}$ of 100 $\qquad = \frac{1}{4} \times 100 = 25$

(c) $\frac{2}{3}$ of 24 $\qquad = \frac{2}{3} \times 24 = 2 \times 8 = 16$

(d) $\frac{3}{5}$ of 125 $\qquad = \frac{3}{5} \times 125 = 3 \times 25 = 75$

(e) $\frac{1}{4}$ of $\frac{3}{4}$ $= \frac{1}{4} \times \frac{3}{4} = \frac{3}{16}$

(f) $1\frac{2}{5}$ of $2\frac{3}{8}$ $= \frac{7}{5}$ of $\frac{19}{8}$

$= \frac{7}{5} \times \frac{19}{8} = \frac{133}{40}$

(g) $\frac{1}{2}$ of $\frac{1}{3}$ of $\frac{6}{5}$ $= \frac{1}{2} \times \frac{1}{3} \times \frac{6}{5}$

$= \frac{6}{30} = \frac{1}{5}$

(h) $\frac{2}{3}$ of $\frac{6}{4}$ of $\frac{5}{15}$ $= \frac{2}{3} \times \frac{6}{4} \times \frac{5}{15}$

$= \frac{5}{15} = \frac{1}{3}$

2. Find the product:

(a) $\frac{2}{3} \times 6$ $= \frac{2}{3} \times 6 = 4$

(b) $\frac{8}{9} \times 12$ $= \frac{8}{9} \times 12 = \frac{32}{3}$

(c) $\frac{3}{8} \times 144$ $= \frac{3}{8} \times 144 = 54$

(d) $\frac{12}{13} \times 169$ $= \frac{12}{13} \times 169 = 156$

(e) $12 \times \frac{3}{4}$ $= 12 \times \frac{3}{4} = 9$

(f) $25 \times \frac{2}{5}$ $= 25 \times \frac{2}{5} = 10$

(g) $80 \times \frac{5}{16}$ $= 80 \times \frac{5}{16} = 25$

(h) $100 \times \frac{1}{125} = 100 \times \frac{1}{25} = 4$

3. Find the product and give your answer into simplest form:

(a) $\frac{7}{4} \times \frac{6}{5} = \frac{21}{10}$

(b) $\frac{2}{5} \times \frac{10}{12}$

$= \frac{2}{5} \times \frac{10}{12} = \frac{1}{3}$

(c) $\frac{5}{7} \times \frac{49}{35}$

$= \frac{5}{7} \times \frac{49}{35} = 1$

(d) $\frac{11}{24} \times \frac{56}{88}$

$= \frac{11}{24} \times \frac{56}{88}$

$= \frac{7}{24}$

(e) $4\frac{4}{15} \times 2\frac{3}{5}$ $= \frac{64}{15} \times \frac{13}{5} = \frac{832}{75}$

(f) $\frac{6}{7} \times 1\frac{3}{22}$ $= \frac{41}{7} \times \frac{25}{3} = \frac{1025}{21}$

(g) $4\frac{21}{25} \times 9\frac{9}{11}$ $= \frac{121}{25} \times \frac{100}{11} = 44$

(h) $\frac{11}{24} \times \frac{56}{88} = \frac{7}{24}$

4. Find the following products:

(a) $\frac{2}{3} \times \frac{4}{9} \times \frac{27}{12}$

$= \frac{2}{3} \times \frac{4}{9} \times \frac{27}{12} = \frac{2}{3}$

(b) $\frac{12}{25} \times \frac{15}{25} \times \frac{40}{30}$

$= \frac{12}{25} \times \frac{15}{28} \times \frac{46}{30}$ $= \frac{48}{140} = \frac{12}{35}$

(c) $2\frac{2}{17} \times 7\frac{2}{9} \times 1\frac{33}{52}$

$= \frac{36}{17} \times \frac{65}{9} \times \frac{88}{52} = 25$

5. Find the following:

(a) $\frac{1}{4}$ of ₹ 300 $= \frac{1}{4} \times 300 =$ ₹75

(b) $\frac{3}{5}$ of 1 kg $= \frac{3}{5} \times 1$ kg = 600g

(c) $\frac{3}{21}$ of 63 litre $= \frac{3}{21} \times 63 = 9$ litre

(d) $\frac{2}{5}$ of 45 kg $= \frac{2}{5} \times 45 = 18$ kg

(e) $\frac{1}{2}$ of 1 dozen $= \frac{1}{2} \times 12 = 6$ articles

(f) $\frac{2}{5}$ of 3 scores $= \frac{2}{5} \times 3 = \frac{6}{5}$

6. $\frac{2}{3}$ of $\frac{6}{5}$ $= \frac{2}{3} \times \frac{6}{5} = \frac{4}{5}$

$\frac{1}{2}$ of 8 $= \frac{1}{2} \times 8 = 4$

$\therefore \frac{1}{2}$ of 8 is greater

7. Cost of 1 litre milk is ₹$11\frac{1}{2}$

Cost of $10\frac{1}{4}$ litre milk is $= 10\frac{1}{4} \times 11\frac{1}{2}$

$= \frac{41}{4} \times \frac{23}{2}$ $=$ ₹ $\frac{943}{8} =$ ₹117.8

8. Cow gives milk in morning $= 5\frac{1}{2}$ litre

Cow gives milk in evening = 6 litre

Cow give milk in 1 day $= 5\frac{1}{2} + \frac{6}{1}$

$= \frac{11}{2} + \frac{6}{1} = \frac{11+12}{2} = \frac{23}{2}$

Cow gives milk in one week $= 7 \times \frac{23}{2}$

$= \frac{161}{2} = 80.5$ litre

9. Cost of 1 litre Petrol = ₹ $75\frac{1}{2}$

Cost of $5\frac{1}{2}$ litre Petrol $= 75\frac{1}{2} \times 5\frac{1}{2}$

$= \frac{151}{2} \times \frac{11}{2} = \frac{1661}{4} = 415.25$ litre

10. Cost of 1 kg sugar = ₹ $35\frac{1}{4}$

Cost of $18\frac{1}{2}$ kg of sugar $= 35\frac{1}{4} \times 18\frac{1}{2}$

$= \frac{141}{4} \times \frac{37}{2} = \frac{5217}{8} =$ ₹ 652.12

11. 1 metre cloth of shirt = ₹ $125\frac{1}{2}$

1 metre cloth of trouser = ₹ $208\frac{1}{4}$

Cost of $2\frac{1}{2}$ metre of shirt $= 125\frac{1}{2} \times 2\frac{1}{2}$

$= \frac{251}{2} \times \frac{5}{2} = \frac{1255}{4} =$ ₹313.75

Cost of $1\frac{3}{4}$ metre cloth of trouser

$= 280\frac{1}{4} \times 1\frac{3}{4}$

$= \frac{1121}{4} \times \frac{7}{4} =$ ₹490.43

Ranu has to Pay = ₹313.75 + ₹490.73 = 804.18

12. $\frac{5}{4} \times 1\frac{3}{5}$

$= \frac{5}{4} \times \frac{8}{5} = 2$ Let the number be x

$= 2 + x = 5 \quad x = 5 - 2 \qquad x = 3$

Exercise-2.3

1. Find the reciprocal of following fractions:

(a) $\frac{1}{8}$ (b) $\frac{13}{8}$ (c) $\frac{21}{10}$ (d) $\frac{3}{11}$ (e) $\frac{3}{4}$

2. Find the multiplicative inverse each of the following:

(a) $\frac{1}{21}$ (b) $\frac{1}{31}$ (c) $\frac{45}{22}$ (d) $\frac{19}{11}$ (e) $\frac{13}{16}$

3. Divide the following:

(a) $16 \div \frac{1}{4} \quad = 16 \times \frac{4}{1} = 64$

(b) $84 \div \frac{6}{11} \quad = 84 \times \frac{11}{6} = 154$

(c) $\frac{17}{5} \div 3.4 = \frac{17}{5} \times \frac{1}{34} = \frac{1}{2}$

(d) $60\frac{1}{3} \div 15\frac{1}{6}$

$= \frac{182}{3} \div \frac{91}{6} \quad = \frac{182}{3} \times \frac{6}{91} = 4$

(e) $\frac{5}{8} \div \frac{8}{5}$

$= \frac{5}{8} \times \frac{5}{8} = \frac{25}{64} = 0.39$

(f) $\frac{11}{13} \div \frac{22}{39}$

$= \frac{11}{13} \times \frac{39}{22} = \frac{3}{2} = 1.5$

(g) $\frac{14}{13} \div \frac{70}{78}$

$= \frac{11}{2} \div \frac{14}{4} = \frac{11}{2} \times \frac{4}{14} = \frac{22}{14} = 1.57$

(h) $5\frac{1}{2} \div 3\frac{2}{4}$

$\frac{11}{2} \times \frac{4}{14} = \frac{22}{14} = 1.57$

4. Let the other number be x

$x \times 2\frac{1}{4} = 4\frac{2}{3} \qquad = x = 4\frac{2}{3} \div 2\frac{1}{4}$

$x = \frac{14}{3} \div \frac{9}{4} = \frac{14}{3} \times \frac{4}{9} = 2.07$

5. Let the breadth of plot be x

Area of rectangle $= l \times b$

$20\frac{1}{4} = \frac{9}{11} \times x \qquad = 20\frac{1}{4} \div \frac{9}{11} = x$

$= \frac{81}{4} \div \frac{9}{11} = x \qquad = \frac{99}{4} = x$

$x = 24.75m$

6. A train cover distance in 3 hrs $= 105\frac{1}{4}$

Train cover distance in 1 hrs

$= 105\frac{1}{4} \times 3 = \frac{421}{4} \div 3$

$= \frac{421}{4} \times \frac{1}{3} = 35.08$ km

7. Cost of $5\frac{1}{2}$ metres cloth $=$ ₹$210\frac{1}{2}$

Cost of 1 metre cloth $= 210\frac{1}{2} \div 5\frac{1}{2}$

$= \frac{421}{2} \div \frac{11}{2} = 38.27$ metres

8. Cost of $5\frac{1}{2}$ kg orange $=$ ₹165

Cost of 1 kg orange $= 165 \div 5\frac{1}{2}$

$= 165 \div \frac{11}{2} = 165 \times \frac{2}{11}$

$= \frac{330}{11} =$ ₹30

9. The length or rope $= 111m$

The 4th part of rope $= \frac{111}{4}m = 27.75m$

10. $x \times 17\frac{4}{5} = 20\frac{1}{3} \qquad x = 20\frac{1}{3} \div 17\frac{4}{5}$

$= \frac{61}{3} \div \frac{89}{5} \qquad = \frac{61}{3} \times \frac{5}{89} = \frac{305}{267} = 1.14$

Exercise-2.4

1. Write the following in figures:

(a) 3.427 (b) 62.007

(c) 193.6505 (d) 874.705

2. Write the following in words:

(a) Fifteen point two eight nine

(b) Zero pint five seven eight

(c) Seventy five point four three one

(d) Two hundred sixteen point nine two five

3. Write the place value of each colours digits of the following decimal numbers:

(a) $\frac{9}{100}$ (b) 70 (c) 1000 (d) $\frac{9}{100}$

4. Write in expanded form:

(a) $400 + 70 + 3 + \frac{4}{10} + \frac{7}{100} + \frac{3}{1000}$

(b) $2000 + 700 + 30 + 1 + \frac{9}{1000}$

(c) $3000 + 200 + 50 + 1 + \frac{6}{10}$

(d) $500 + 50 + 5 + \frac{5}{100}$

5. Write in short form:

(a) 45.123 (b) 9.067 (c) 560.894

(d) 2432.689 (e) 0.569

Exercise-2.5

1. Convert each of the following into like decimals:

(a) 1.700, 2.250, 3.768

(b) 7.22, 1.20, 6.17

(c) 68.547, 62.600, 72.710

(d) 92,517, 92.500, 92.510

2. Put >, < or = in given boxes:

(a) < (b) > (c) = (d) < (e) = (f) <

3. Arrange the following in ascending order:

(a) 0.001 < 0.11 < 1.01 < 1.11 < 1.21

(b) 1.00 < 1.002 < 1.01 < 1.1 < 1.11

(c) 0.004 < 0.04 < 0.42 < 0.4 < 0.444

(d) 0.576 < 5.76 < 56.7 < 57.6 < 67.5

4. Arrange the following in descending order:

(a) 6.66 > 6.611 > 6.6 > 6.06 > 0.666

(b) 9.7 > 6.7 > 6.3 > 2.7 > 1.7

(c) 186.5 > 18.65 > 1.865 > 0.1865 > 0.1865

(d) 44.41 > 44.4 > 44.04 > 4.44 > 0.444

Exercise-2.6

1. Arrange in columns and find the sum:

(a)
```
  24.520
  17.200
+ 46.869
  88.589
```

(b)
```
  01.720
  11.571
+ 36.010
  49.301
```

(c)
```
  173.000
  273.542
+ 018.730
  465.272
```

(d)
```
  184.175
   75.620
+  92.000
  351.795
```

(e)
```
  444.444
   44.440
    4.400
+   4.000
  497.284
```

(f)
```
   68.60
  791.720
  832.832
+   0.320
 1693.472
```

2. Arrange in column and find difference:

(a) 65.32 and 100
```
  100.00
–  65.32
   34.68
```

(b) 18.726 and 17.623
```
  18.226
– 17.623
   1.103
```

(c) 35.759 and 123.001
```
  123.001
–  35.759
   87.242
```

(d) 92.85 and 45.656
```
  92.850
– 45.656
  47.194
```

(e) 700 and 572.827
```
  700.000
– 572.827
  127.173
```

(f) 56.759 and 27.325
```
  56.759
– 27.325
  29.434
```

3. Simplify the following

(a) 32.592 + 64.72 – 81.675
= 97.314 – 81.675 = 15.639

(b) 100 – 72.28 + 35.625
=27.72 + 35.625 = 63.345

(c) 77.77 – 33.44 + 25.382
= 44.33 + 25.382 = 69.712

(d) 400 – 7.32 – 19.52 – 18.5
= 392.68 – 19.52 – 18.5
= 373.16 – 18.5
= 373.16 – 18.5 = 354.66

(e) 35.52 – 62.54 + 81.32
= 35.52 – 143.86 = 54.3

(f) 45.54 + 54.54 – 62.725
= 100.08 – 62.725 = 37.355

4. 1000 – 542.952
= 457.048

5. 65.52 – 15.789
```
  65.520
– 15.789
  49.731
```

6. Let the other number be x
$x + 125.689 = 745.629$
$x = 745.629 - 125.689 \quad x = 619.94$

7. Amount of water in bracket = 40 litre
Amount of water taken out = 16.786
Amount of water left in bracket = 40 – 16.786 = 23.232 litre

8. 62.8 + 15.975 = 78.775
Subtract 52.795 from 78.775
= 78.775 – 52.795 = 25.98

Exercise-2.7

1. Multiply the following:

(a) 12.5 × 6 = 75 (b) 218.88
(c) 1771.84 (d) 13.64 (e) 21.06
(f) 278.1 (g) 342.825 (h) 26580.3

2. Find the product:

(a) 21.7 × 1.5 = 32.55
(b) 16.27 × 2.21 = 35.9567
(c) 1.351 × 1.57 = 2.12107
(d) 6.725 × 1.23 = 8.27175
(e) 19.84 × 3.61 = 71.6224
(f) 50.21 × 1.75 = 87.8675
(g) 6.350 × 2.95 = 18.542
(h) 0.007 × 0.001 = 0.0000007

3. Fill in the blanks:

(a) 127.2 (b) 197.23 (c) 699 (d) 632.1
(e) 5432 (f) 0.77 (g) 1100 (h) 6750

4. Multiply:

(a) 6.5 × 7.2 × 1.8
= 46.8 × 1.8 = 84.25

(b) 11.7 × 1.17 × 0.17
= 13.689 × 0.17 = 2.32716

(c) 6.5 × 6.51 × 7.21
= 42.315 × 7.21 = 305.09115

(d) 2.02 × 20.2 × 0.202
= 40.804 × 0.202 = 8.242408

(e) 5.5 × 4.4 × 3.3
= 24.2 × 3.3 = 79.86

(f) 6.72 × 1.8 × 8.01
= 12.096 × 8.01 = 96.88896

Exercise-2.8

1. Divide the following:

(a) 68.4 ÷ 2 = 34.2
(b) 39.39 ÷ 3 = 13.13
(c) 53.56 ÷ 4 = 13.39
(d) 15.18 ÷ 11 = 1.38
(e) 140.25 ÷ 15 = 9.35
(f) 42.66 ÷ 18 = 2.37
(g) 159.052 ÷ 17 = 9.356
(h) 117.656 ÷ 22 = 5.348
(i) 0.08 ÷ 10 = 0.0008
(j) 13.08 ÷ 24 = 0.545
(k) 0.049 ÷ 7 = 0.0007
(l) 1.877 ÷ 25 = 0.07508

2. Divide the following:

(a) 0.0155 (b) 5.193 (c) 452.3 (d) 10
(e) 61.2 (f) 35.12 (g) 6.747 (h) 0.112
(i) 909 (j) 0.14 (k) 2.8 (l) 4.1

3. Fill in the blanks:

(a) 6.4532 (b) 0.08 (c) 92.45
(d) 5.4375 (e) 66.32 (f) 84.321
(g) 0.009162 (h) 0.03462

Exercise-2.9

1. Sunita used milk for tea = 15.625 *l*
Sunita used milk for sweet = 30.650 *l*
Sunita used milk for children = 3.568
Amount of milk sunita used that day
= 15.625 + 30.650 + 3.568
= 49.843 litre

2. Price of book = ₹62.75
Cost of bag = ₹175.50
Cost of stationary = ₹368.25
Total amount a student has to pay
= 62.75 + 175.50 + 368.25
= ₹606.5

3. Height of Aditi = 1.80m
Height of Disha = 1.20 m
Aditi is more taller than Disha = 1.80 – 1.20 = 0.6 m
Aditi is 0.6 m taller than Disha

4. Length of rope 117.65 m
Length of cutted roped = 58.96 m
Length of left rope = 117.65 – 58.96 m = 58.69 m

5. Cloth required for 1 shirt = 2.25 m
Cloth required for 25 shirts = 25 × 2.25 m = 56.25
Cost of 1 m cloth = ₹98.75
Total cost of shirts = 56.25 × 98.75
= ₹5554.6875

6. Let the other number be x
$x \times 1.01 = 53.14721$
$x = 53.14721 \div 1.01$
$x = 52.621$

7. Amount of sweets distributed in 25 students = 14 kg 100 g = 14.1 kg
Amount of sweets distributed in 1 student = 14.1 ÷ 25 = 0.564 kg

8. Mass of 18 bags = 360.18 kg
Mass 1 bag = 360.18 ÷ 18
= 20.011 g

Multiple Choice Questions

1. b **2.** b **3.** a **4.** c **5.** b

NCERT CORNER

Fill in the blanks:

1. 825 **2.** 125 **3.** 1.321 **4.** 4 **5.** 0.10

True or False

1. False **2.** True **3.** False **4.** True **5.** True

Chapter-3

Exercise-3.1

1. A die ---------- obtained.

Score	Tally mark	Frequency
1	|||	3
2	|||| ||	7
3	|||	3
4	|||	3
5	||||	5
6	|||	3
	Total	25

2. (a) Range = Highest value – Lowest value

$= 3.4 - 1.9 = 1.5$

(b) Mean $= \dfrac{\text{Sum ofobservation}}{\text{Total observation}}$

$= \dfrac{2.8+2.5+2.1+2.3+2.5+1.9+2.6+2.0+3.1+3.4}{10}$

$= \dfrac{25.2}{10} = 2.52$

(c) 1.9, 2.0, 2.1, 2.3, 2.5, 2.5, 2.6, 2.8, 3.1, 3.4

Let the nth term be 2.3 n = 2.3

$= \left(\dfrac{2.3+1}{2}\right)^{th}$ term $= \left(\dfrac{3.3}{2}\right)^{th}$ term

$= (1.65)^{th}$ term = 1.9

(d) 2.5

3. 1, 2, 3, 4, 5, 6, 7, 8

Mean $= \dfrac{\text{Sum ofobservation}}{\text{Total no of observation}}$

$= \dfrac{1+2+3+4+5+6+7+8}{8}$

$= \dfrac{36}{8} = 4.5$

4. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Mean

$= \dfrac{1+2+3+4+5+6+7+8+9+10}{10}$

$= \dfrac{55}{10} = 5.5$

5. Mean $= \dfrac{10+20+30+c+40+50}{6}$

$30 = \dfrac{150+x}{6}$ $= 30 \times 6 = 150 + x$

$= 180 - 150 = x$ $x = 30$

6. (a)Mean$= \dfrac{4+6+7+8+5+12+6+9}{8}$

$= \dfrac{57}{8} = 7.125$

(b) Mean

$= \dfrac{1+3+4+5+6+9+12+15+20+4+3+4+4}{13}$

$= \dfrac{90}{13} = 6.92$

(c) 5, 4, 5, 3, 5, 7, 11, 12

Mean$= \dfrac{5+4+5+3+5+7+11+12}{8}$

$= \dfrac{52}{8} = 6.5$

(d) 5, 4, 5, 7, 5, 8, 9

Mean $= \dfrac{5+4+5+7+5+8+9}{7}$

$= \dfrac{43}{7} = 6.14$

7. 20, 122, 119, 124, 125, 120, 120

Mean =

$\dfrac{120+122+119+124+125+120+126}{7}$

$= \dfrac{856}{7} = 122.2$

8. 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Median $= \left(\dfrac{10+12}{2}\right)^{th}$

$= \dfrac{22}{2} = 11$

9. 3, 5, 7, 11, 13, 17, 19, 23, 29, 31

Median $= \dfrac{5^{th}+6^{th}}{2}$

$$= \frac{13+17}{2} = 15$$

10. 2, 3, 5, 7, 11, 13, 17, 18, 23, 27

$$\text{Median} = \left(\frac{n}{2}\right)^{th} + \frac{\left(\frac{n}{2}+1\right)^{th}}{2}$$

$$= \frac{(5)^{th} + (6)^{th}}{2} = \frac{11+13}{2}$$

$$= \frac{24}{2} = 12$$

11. (a) 14, 15, 9, 11, 5, 7

Increasing order 5, 7, 9, 11, 14, 15

n = 6 (even)

$$\text{Median} = \frac{\left(\frac{6}{2}\right)^{th}\text{term} + \left(\frac{6}{2}+1\right)^{th}\text{term}}{2}$$

$$= \frac{3^{th}\text{ term} + 4^{th}\text{ term}}{2}$$

$$= \frac{9+11}{2} = \frac{20}{2} = 10$$

(b) 12, 18, 10, 5, 14, 11, 13

Increasing order = 5, 10, 11, 12, 13, 14, 18

n = 7 (odd)

$$\text{Median} = \left(\frac{7+1}{2}\right)^{th}\text{term}$$

$$= \left(\frac{8}{2}\right)^{th} = 4^{th}\text{ term} = 12$$

(c) 5, 4, 5, 3, 5, 7, 11, 12

Increasing order = 3, 4, 5, 5, 5, 7, 11, 12

n = 8 (even)

$$\text{Median} = \left(\frac{8}{2}\right)^{th} + \left(\frac{8}{2}+1\right)^{th}\text{term}$$

$$= \frac{4^{th} + 5^{th}\text{ term}}{2}$$

$$= \frac{5+5}{2} = \frac{10}{2} = 5$$

(d) 9, 8, 10, 15, 14, 3, 2, 15

Increasing order = 2, 3, 8, 9, 10, 14, 15, 15

n = 8 (even)

$$\text{Median} = \frac{\left(\frac{8}{2}\right)^{th} + \left(\frac{8}{2}+1\right)^{th}\text{term}}{2}$$

$$= \frac{4^{th}\text{ term} + 5^{th}\text{ term}}{2}$$

$$= \frac{9+10}{2} = \frac{19}{2} = 9.5$$

12. 14, 9, 5, 11, 18, 17, 15, 21, 12, 15

Increasing order = 5, 9, 11, 12, 14, 15, 15, 17, 18, 21

n = 10 (even)

$$\text{Median} = \frac{\left(\frac{n}{2}\right)^{th}\text{term} + \left(\frac{n}{2}+1\right)^{th}\text{term}}{2}$$

$$= \frac{(4)^{th}\text{ term} + (5)^{th}\text{ term}}{2}$$

$$= \frac{14+15}{2} = \frac{29}{2} = 14.5$$

of 15 is replaced by 18 then,

= 5, 9, 11, 12, 14, 17, 18, 18, 18, 21

n = 10 (even)

$$\text{Median} = \frac{\left(\frac{n}{2}\right)^{th}\text{term} + \left(\frac{n}{2}+1\right)^{th}\text{term}}{2}$$

$$= \frac{(5)^{th}\text{ term} + (6)^{th}\text{ term}}{2}$$

$$= \frac{14+17}{2} = \frac{31}{2} = 15.5$$

13. Mode = Number occurring maximum time

= 2 and 4

14. First 10 prime number is - 2, 3, 5, 7, 11, 13, 17, 19, 23, 29

$$\text{Mean} = \frac{\text{Sum of observation}}{\text{Total no.of observation}}$$

$$= \frac{2+3+5+7+11+13+17+19+23+29}{10}$$

$$= \frac{129}{10} = 12.9$$

n = 10 (even)

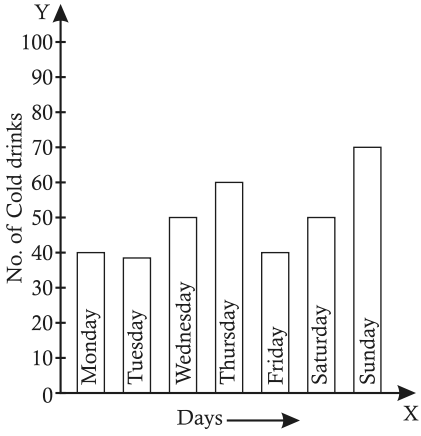
$$= \frac{\left(\frac{n}{2}\right)^{th}\text{term} + \left(\frac{n}{2}+1\right)^{th}\text{term}}{2}$$

$$= \frac{(5)^{th} \text{ term} + (6)^{th} \text{ term}}{2}$$

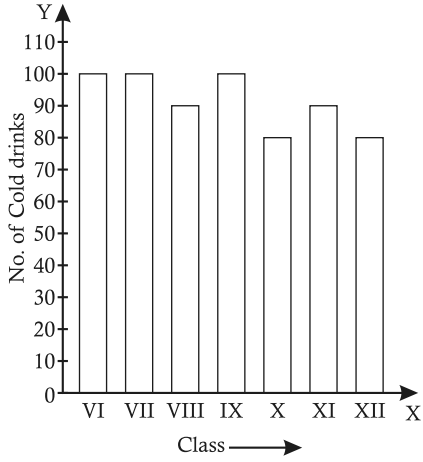
$$= \frac{11+13}{2} = \frac{24}{2} = 12$$

Exercise-3.2

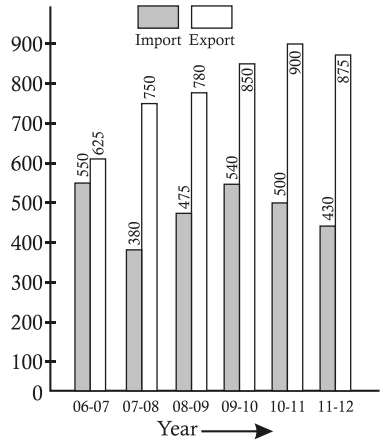
1.



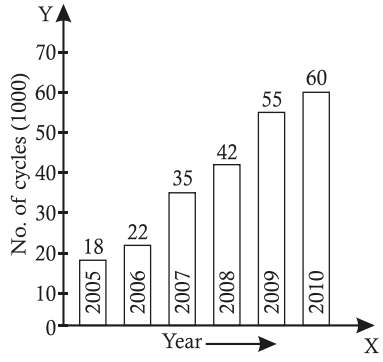
2.



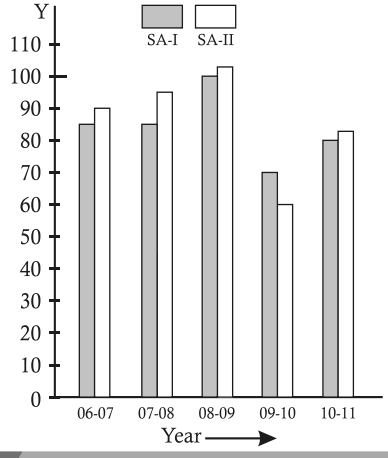
3.



4.



5.



(a) Performance of class X & XII
(b) 98%, 2011-12
(c) 95%, 2007-08
(d) 86.17% (e) 85.83%

Exercise-3.3

1. Sample space [H, T]

$$P[H] = \frac{n[H]}{n[S]} = \frac{1}{2}$$

2. Sample space [H, T]

$$P[T] = \frac{n[T]}{n[S]} = \frac{1}{2}$$

3. (a) $n(s) = 100$

$n(H) = 45, n(T) = 55$

(b) $P[H] = \frac{n[H]}{n[S]} = \frac{45}{100} = \frac{9}{20}$

$P[T] = \frac{n[T]}{n[S]} = \frac{55}{100} = \frac{11}{20}$

4. $n(s) = 100, n(H) = 20$

(a) $P[H] = \frac{20}{100} = \frac{1}{5}$

(b) $P[NH] = \frac{80}{100} = \frac{4}{5}$

5. $n(S) = 18, n(W) = 6, n(R) = 7, n(B) = 5$

(a) $P[W] = \frac{n[W]}{n[S]} = \frac{6}{18} = \frac{1}{3}$

(b) $P[R] = \frac{n[R]}{n[S]} = \frac{7}{18}$

(c) $P[B] = \frac{n[B]}{n[S]} = \frac{5}{18}$

(d) $P[P] = \frac{n[P]}{n[S]} = \frac{0}{18} = 0$

Multiple Choice Question

1. c **2.** b **3.** a **4.** b **5.** c

NCERT CORNER

Fill in the blanks:

1. Sample Space **2.** 1 **3.** 0 **4.** b and i

5. Negative or greater than 1

True or False

1. True **2.** True **3.** False **4.** False **5.** False

Chapter-4

Exercise-4.1

1. Form the equation from given statements:

(a) $x + 6 = 1$ (b) $x - 10 = 8$

(c) $6x = 18$ (d) $\frac{1}{3} + 10 = 28$

(e) $10x - 15 = 20$ (f) $\frac{x}{2} + \frac{x}{3} = 18$

(g) $3x - 2x = 10$

2. Check wheathe the given values of variables are solution of given equations or not:

(a) $2x + 3 = 9$ where $x = 3$

$2 \times 3 + 3 = 9$

$6 + 93 = 9$

$9 = 9$ Hence Proved

(b) $\frac{x}{3} = 5$ where $x = 5$

$= \frac{5}{3} = 5$ No, it is not the sol.

(c) $4x - 7 = 3x + 8$ where $x = 15$

$4 \times 15 - 7 = 3 \times 15 + 8$

$60 - 7 = 45 + 8$

$53 = 53$ Yes, it is the sol.

(d) $2(x + 10) = 3(x - 2)$ where $x = 5$

$2(5 + 10) = 3(5 - 2)$

$2 \times 15 = 3 \times 3$

$30 = 9$ No, it is the sol.

3. Solve the following equation by adding, subtracting, multipling or dividing both sides by same quantity:

(a) $x + 9 = 10$

$x = 10 - 9$ $x = 1$

(b) $x - 12 = 18$

$x = 18 + 12$ $x = 30$

(c) $5x = 15$

$x = \frac{15}{5}$ $x = 3$

(d) $\frac{x}{3} = 18$

$x = 18 \times 3$ $\quad x = 54$

(e) $5x - 9 = 101$

$5x = 11 + 9$

$5x = 20$ $\quad x = 4$

(f) $10x - 5 = 2x + 11$

$10x - 2x = 11 + 5$

$8x = 16$

$x = \frac{61}{8}$ $\quad x = 2$

4. Solve the following equations by using transposition method:

(a) $x - 5 = 18$

$x = 18 + 5$ $\quad x = 23$

(b) $x - 60 = -70$

$x = -70 + 60$ $\quad x = -10$

(c) $2x - 8 = x + 7$

$2x - x = 7 + 8$ $\quad x = 15$

(d) $2x - 10 = 5 - x$

$2x + x = 5 + 10$

$3x = 15$ $\quad x = \frac{15}{3} = 5$

(e) $8x - x = -21$

$7x = -21$ $\quad x = -3$

(f) $8x - 6x + 10$

$8x - 6x = 10$

$2x = 10$ $\quad x = \frac{10}{2} = 5$

(g) $3(x + 1) = 6$

$3x + 3 = 6$

$3x = 6 - 3$ $\quad 3x = 3$ $\quad x = 1$

(h) $4x = -2x + 30$

$4x + 2x = 30$

$6x = 30$ $\quad x = \frac{30}{6}$ $\quad x = 5$

(i) $11x + 9 = 42$

$11x = 42 - 9$

$11x = 133$ $\quad x = \frac{33}{11}$ $\quad x = 3$

(j) $4x = -2x + 30$

$4x + 32x = 30$

$6x = 30$ $\quad x = 5$

(k) $-2x = 8x + 36$

$-2x - 8x = 36$

$-10x = 36$ $\quad x = \frac{-36}{10}$ $\quad x = \frac{13}{5}$

(l) $\frac{x}{3} + 5 = 12$

Taking L.C.M of 3 and 1

$\frac{x + 15}{3} = 12$

$x + 15 = 12 \times 3$

$x + 15 = 36$ $\quad x = 36 - 15$ $\quad x = 21$

5. Solve the following equations:

(a) $\frac{x}{2} - 2 = 26$

Taking LCM of 2 and 1

$= \frac{x - 4}{2} = 26$

$x - 4 = 26 \times 2$

$x - 4 = 52$ $\quad x = 48$

(b) $\frac{x + 1}{5} - 3 = 27$

Taking LCM of 5 and 1

$= \frac{(x + 1) - 15}{5} = 27$

$(x + 1) - 15 = 27 \times 5$

$(x + 1) - 15 = 135$

$x + 1 = 135 + 15$

$x + 1 = 150$

$x = 150 - 1$ $\quad x = 149$

(c) $5(2x - 3) - 3(3x - 7) = 5$

$10x - 15 - 9x + 21 = 15$

$10x - 9x - 15 + 21 = 5$

$x - 15 + 21 = 5$

$x - 15 = 5 - 21$

$x - 15 = 16$ $\quad x = 16 + 15$ $\quad x = 31$

(d) $3x - 5x - 12$

$3x - 5x = -12 + 2$

$-2x = -10$ $\quad x = 5$

(e) $12x = 7x - 5$

$12x - 7x = -5$

$5x = -5 \qquad x = -1$

(f) $15(x-9) - 2(x-12) + 5(x+6) = 0$

$15x - 135 - 2x + 24 + 5x + 30 = 0$

$15x - 2x + 5x - 135 + 24 + 30 = 0$

$13x + 5x - 135 + 24 + 30 = 0$

$18x - 135 + 54 = 0$

$18x - 81 = 0$

$18x = 81 \qquad x = \frac{81}{18} \qquad x = \frac{9}{2}$

(g) $2x - \frac{1}{3} = \frac{1}{5} - x$

$= \frac{6x-1}{3} = \frac{1-5x}{5}$

$5(6x-1) = 3(1-5x)$

$30x - 5 = 3 - 15x$

$30x + 15x = 3 + 5$

$45x = 8 \qquad x = \frac{8}{45}$

(h) $30 = 6(8+x)$

$30 = 48 + 6x$

$30 - 48 = 6x$

$-18 = 6x \qquad x = \frac{-18}{6} \qquad x = -3$

6. Solve the following equation:

(a) $2.45\text{ m} + 1.5 = 3.7\text{ m} - 2.25$

$2.45\text{ m} - 3.7\text{ m} = -2.25 - 1.5$

$-1.25\text{ m} = -3.75$

$\text{m} = \frac{-3.75}{-1.25} \qquad \text{m} = 3$

(b) $2.4(2-x) - 0.6(4x-3) = 0$

$4.8 - 2.4x - 2.4x + 1.8 = 0$

$6.6 - 4.8x = 0$

$6.6 = 4.8x \qquad \frac{6.6}{4.8} = x \qquad x = 1.375$

(c) $\frac{9\text{m}+7}{2} - \left(\text{m} - \frac{\text{m}-2}{7}\right) = 36$

$\frac{9\text{m}+7}{2} - \left(\frac{7\text{m}-\text{m}-2}{7}\right) = 36$

$\frac{9\text{m}+7}{2} - \left(\frac{6\text{m}-2}{7}\right) = 36$

$\frac{7(9\text{m}+7) - 2(6\text{m}-2)}{14} = 36$

$\frac{63\text{m} + 49 - 12\text{m} - 84}{14} - = 36$

$63\text{ m} + 49 - 12\text{m} + 4 = 36 \times 14$

$51\text{m} + 53 = 504$

$51\text{ m} = 504 - 53 \qquad \text{m} = \frac{451}{51}$

(d) $2x - 3 = \frac{3}{10}(5x-12)$

$(2x-3)10 = 3(5x-12)$

$20x - 30 = 10x - 36$

$20x - 10x = -36 + 30$

$10x = -6 \qquad x = \frac{-3}{5}$

(e) $x + \frac{x}{2} = 45$

$= \frac{2x+x}{2} = 45$

$2x + x = 45 \times 2 \qquad 3x = 90$

$x = 30$

(f) $\frac{1}{2}x - 3 = 5 + \frac{1}{3}x$

$\frac{x}{2} - 3 = 5 + \frac{1}{3}x \qquad \frac{x-6}{2} = 5 + \frac{x}{3}$

$\frac{x-6}{2} = \frac{15+x}{3}$

$3x - 18 = 30 + 2x$

$3x - 2x = 30 + 18 \qquad x = 48$

(g) $\frac{1}{4}\text{m} + \frac{1}{6}\text{m} = \frac{\text{m}}{2} + \frac{3}{4}$

$\frac{\text{m}}{4} + \frac{\text{m}}{6} = \frac{\text{m}}{2} + \frac{3}{4}$

$\frac{3\text{m}+2\text{m}}{12} = \frac{2\text{m}+3}{4}$

$4(3\text{m} + 2\text{m}) = 12(2\text{m} + 3)$

$12\text{m} + 8\text{ m} = 24\text{ m} + 36$

$20\text{ m} = 24\text{m} + 36$

$2\text{ m} - 24\text{ m} = 36$

$-4\text{ m} = 36 \qquad \text{m} = -\frac{36}{4}$

$\text{m} = -9$

(h) $\frac{2x+3}{3}+\frac{x-3}{2}=3$

$\frac{2(2x+3)+3(x-3)}{6}=3$

$\frac{4x+6+3x-9}{6}=3$

$4x+6+3x-9=18$

$4x+6+3x=18+9$

$4x+6+3x=27$

$7x=21 \qquad x=3$

Exercise-4.2

1. Let the pen cost be x

Let the book cost be $3x$

$x+3x=96$

$4x=96$

$x=24$

2. Let the number be x

$x+13=46$

$x=46-13 \qquad x=33$

3. Let the number be x

$3x-10=105$

$3x=105+10$

$3x=115 \qquad x=\frac{115}{3}$

4. Let the number be x

$3x+5=20$

$3x=20-5$

$3x=15 \qquad x=5$

5. Three consecutive even number are $x, x+2, x+4$

$x+x+2+x+4=96$

$36x+6=96$

$3x=96 \qquad x=30$

$x+2=30+2=32$

$x+4=30+4=34$

6. Let the three consecutive integers be $x, x+1, x+2$

$x+x+1+x+2=39$

$3x+3=39$

$3x=36 \qquad x=12$

$x+1=12+1=13$

$x+2=12+2=14$

7. The side of triangle $2x, 3x, 4x$

Perimeter of triangle $=2x+3x+4x$

$126=9x \qquad x=\frac{126}{9} \qquad x=14$

8. Let the Radihka age be x

Radhika's mother age be $4x$

$x+4x=60$

$5x=60 \qquad x=\frac{60}{5} \qquad x=12$

Radhika age = 12 years

Radhika mother's age = 4 × 12 = 48 years

9. Let the breadth of rectangle be x

Let the length of rectangle be $4x$

Perimeter of rectangle = $2\,l+b$

$100=(4x+x)$

$100=8x+2x$

$100=10x \qquad \frac{100}{10}=x \qquad x=10$

10. Let the three consecutive multiple of 7 be

$7x, (7x+7), (7x+14)$

$=7x+7x+7+7x+14=63$

$21x+21=63$

$21x=42 \qquad x=\frac{42}{21} \qquad x=2$

$7x=7\times2=14$

$7x+7=14+7=21$

$7x+14=7\times2+14=28$

Multiple Choice Questions

1. b **2.** b **3.** c **4.** a **5.** c

Fill in the blanks:

1. Linear **2.** Variables **3.** Solution **4.** two, L.H.S., R.H.S. **5.** Literal

True or False:

1. False **2.** True **3.** False **4.** False **5.** True

Chapter-5

Chapter - 5.1

1. Write the complements each of the following angles:

(a) 20°

Complement $= 90^\circ - 20^\circ = 70^\circ$

(b) 62°

Complement $= 90^\circ - 62^\circ = 28^\circ$

(c) 80°

Complement $= 90^\circ - 80^\circ = 10^\circ$

(d) 55°

Complement $= 90^\circ - 55^\circ = 35^\circ$

(e) 45°

Complement $= 90^\circ - 45^\circ = 45^\circ$

(f) 35°

Complement $= 90^\circ - 35^\circ = 55^\circ$

(g) $22\frac{1^\circ}{2}$

Complement $= 90^\circ - 22\frac{1^\circ}{2}$

$= 67\frac{1^\circ}{2}$

(h) 18°

Complement $= 90^\circ - 18^\circ = 72^\circ$

(i) 25°

Complement $= 90^\circ - 25^\circ = 65^\circ$

(j) 60°

Complement $= 90^\circ - 60^\circ = 30^\circ$

2. Write the supplements each of the following angles:

(a) 60° (b) 120° (c) 35°

(d) 95° (e) 90° (f) 92°

(g) 45° (h) $89\frac{1^\circ}{2}$ (i) 105°

(j) 70°

3. Identify as complementary angles or supplementary angles:

(a) Complementary angles

(b) Matter supplementary angles

(c) Complementary angles nor supplementary angles

(d) Complementary

(e) Supplementary

(f) Supplementary

(g) Complementary

(h) Complementary

4. True and False:

(a) False (b) False

(c) False (d) False

5. Write the name of adjacent angles in given figure:

(a) $\angle AOC$ and $\angle BOC$

(b) $\angle AOD$ and $\angle COD$, $\angle DOC$ and $\angle COB$, $\angle AOC$ and $\angle COB$, $\angle AOD$ and $\angle DOB$

6. Adjacent angles: $\angle AOC$ and $\angle COB$, $\angle COB$ and $\angle BOD$, $\angle BOD$ and $\angle DOB$, $\angle AOD$ and $\angle DOA$, $\angle AOD$ and $\angle AOC$

Vertically opposite angles: $\angle AOC$ and $\angle BOD$, BOC and $\angle DOA$

7. In the given figure find the value of unknowns:

(a) $x + 50 = 180^\circ$

$x = 180^\circ - 50^\circ x = 130^\circ$

(b) $2x + 3x + 5x = 180^\circ$

$10x = 180^\circ$

$x = \frac{180^\circ}{10}$ $x = 18^\circ$

$2 \times 18 = 36^\circ$ $3 \times 18 = 54^\circ$

$5 \times 18 = 90^\circ$

(c) $50^\circ + y = 180^\circ$

$y = 180^\circ - 50^\circ$ $y = 130^\circ$

$130^\circ + z = 180^\circ$

$180^\circ - 130^\circ = z$ $z = 50^\circ$

$50^\circ + x = 180^\circ$

$x^\circ = 180^\circ = 50$ $z = 130^\circ$

8. In the following figure find the value of x or y if $\angle PQR$ is a right angle:

(a) $x^\circ + 30^\circ = 90^\circ$

$x^\circ + 90^\circ - 30^\circ x^\circ = 60^\circ$

(b) $x^\circ + x^\circ = 90^\circ$

$2x^\circ = 90^\circ$ $x = 45^\circ$

(c) $x^\circ + x^\circ + x^\circ = 90^\circ$

$3x^\circ = 90^\circ x \frac{90^\circ}{3}$ $x = 30^\circ$

(d) $x + 10° + x + 30° = 90°$

$2x + 40° = 90°$

$2x = 40° - 90°$

$2x = 50°$ $\quad x = 25°$

(e) $x + 90° = 180°$ $\quad x = 90°$

$90° + y = 180°$ $\quad y = 90°$

$90 + Q = 180°$ $\quad Q = 90°$

9. $\angle AOC + \angle BOC = 180°$

$2x + 60° + x + 30° = 180°$

$3x + 90° = 180°$

$3x = 180° - 90°$

$3x = 90°$ $\quad x = 30°$

$\angle AOC = 2 \times 30° + 60°$

$= 60° + 60° = 120°$

$\angle BOC = 30° + 30° = 60°$

10. Let the angle be x

$x + x = 90°$

$2x = 90°$ $\quad x = 45°$

11. Let the angle be x

$x + x = 180°$ $\quad 2x = 180°$

$x = \frac{180°}{2}$ $\quad x = 90°$

12. Let the angle be x

$y = 2x$

$x + y = 90°$

$x + 2x = 90°$

$3x = 90°$ $\quad x = 30°$

13. Let be 1st angle is second

$y = 2x$

$x + y = 180°$

$x + 2x = 180°$

$3x = 180° x = 60°$

$y = 2x = 2 \times 60° = 120°$

14. Adjacent angles : $\angle$POR and $\angle$QOR, $\angle$ROQ and $\angle$QOS, $\angle$QOS and $\angle$SOP, $\angle$SOP and $\angle$POR

Vertically opposite angle: $\angle$POR and $\angle$QOS, $\angle$QOR and $\angle$POS

15. $x = 30°$(Vertically opposite angle)

$x = 45°$(Vertically opposite angle)

$w + 45° + 30° = 180°$

$w + 75 = 180°$

$w = 180° - 75°$ $\quad w = 105°$

$z = w$ (Vertically opposite angle)

$105° = 105°$

16. Classify the following angles according to their measure:

(a) Complete angle

(b) Reflex angle (c) Acute angle

(d) Straight angle

(e) Complete angle

(f) Acute angle (g) Zero angle

(h) Acute angle (i) Obtuse angle

(j) Obtuse angle

Exercise 5.2

1. In the following. Write the name transversal:

(a) PQ (b) AB (c) XY

(d) No transversal

2. In the given figure land m are two lines and t is transversal. Write the name of following angles:

(a) $\angle 2$ and $\angle 7$, $\angle 4$ and $\angle 5$

(b) $\angle 1$ and $\angle 8$, $\angle 3$ and $\angle 6$

(c) $\angle 1$ and $\angle 5$, $\angle 2$ and $\angle 6$, $\angle 3$ and $\angle 7$, $\angle 4$ and $\angle 8$

(d) $\angle 2$ and $\angle 5$, $\angle 4$ and $\angle 7$

(e) $\angle 2$, $\angle 5$, $\angle 4$, $\angle 4$

(f) $\angle 1$, $\angle 6$, $\angle 3$, $\angle 8$

(g) $\angle 2$ and $\angle 3$, $\angle 1$ and $\angle 4$, $\angle 5$ and $\angle 8$, $\angle 6$ and $\angle 7$

3. $\angle 5° = \angle 7°$ (Vertical opposite angle)

$60° = 60° = \angle 7 = 60°$

$\angle 1° = \angle 5°$ (Alternate Interior angle)

$60° = 60°$

$\angle 1° = \angle 3°$ (Vertical opposite angle)

$60° = 60° = \angle 3° = 60°$

$\angle 2 + \angle 1 = 180°$

$\angle 2 + 60° = 180°$

$\angle 2° = 180° - 60°$ $\quad \angle 2° = 20°$

$\angle 2 = \angle 4$ (Vertically opposite angle)

$20° = 20°$ $\quad \angle 4 = 20°$

$\angle 6 + \angle 5 = 180°$

$\angle 6 + 60° = 180°$

$\angle 6 = 180° - 60°$ $\angle 6 = 20°$

4. $\angle 1 : \angle 2 = 2:3$

$2x + 3x = 180°$ $5x = 180°$

$x = \frac{180°}{5}$ $x = 36°$

$\angle 1 = 2 \times 36$ $\angle 2 = 3 \times 36°$

$\angle 1 = 72°$ $\angle 2 = 102°$

$\angle 2 = \angle 4$ (Vertically opposite angle)

$\angle 4 = 102°$

$\angle 1 = \angle 3$ (Vertically opposite angle)

$\angle 3 = 72°$

$\angle 6 = \angle 4$ (Alternate interior angle)

$\angle 6 = 102°$

$\angle 5 = \angle 3$ (Alternate interior angle)

$\angle 5 = 72°$

$\angle 5 = \angle 7$ (Vertically opposite angle)

$\angle 7 = 72°$

$\angle 6 = \angle 8$ (Vertically opposite angle)

$\angle 8 = 102°$

5. $\angle 5 = 2x - 10°$

$\angle 3 = x + 50°$

$\angle 5 = \angle 3$ (Alternate interior angle)

$2x - 10° = x + 50°$

$2x - x = 50° + 10° x = 60°$

$\angle 3 = 60° + 50°$ $x = 110°$

$\angle 5 = 2 \times 60° - 10°$

$\angle 5 = 120° - 10°$ $\angle 5 = 110°$

$\angle 5 = \angle 7$ (Vertically opposite angle)

$\angle 7 = 110°$

$\angle 3 = \angle 1$ (Vertically opposite angle)

$\angle 1 = 110°$

$\angle 7 + \angle 8 = 180°$ $110° + x = 180°$

$x = 180° - 110°$ $x = 70°$

$\angle 8 = 70°$

$\angle 8 = \angle 6$ (Vertically opposite angle)

$\angle 6 = 70°$

$\angle 1 + \angle 2 = 180°$ (Straight angle)

$110° + \angle 2 = 180°$

$\angle 2 = 180° - 110°$ $\angle 2 = 70°$

$\angle 2 = \angle 4$ (Vertically opposite angle)

$\angle 4 = 70°$

6. $\angle 6 : \angle 3 = 1:4$

$\angle 3 + \angle 6 = 180°$ (Sum of co-interior angle)

$4x + x = 180°$ $5x = 180°$

$x = \frac{180°}{5}$ $x = 36°$

$x = 36°$ $\angle 3 = 4x = x$

$\angle 6 = 36°$ $\angle 3 = 144°$

$\angle 3 = \angle 1$ (Vertically opposite angle)

$\angle 1 = 144°$

$\angle 6 = \angle 8$ (Vertically opposite angle)

$\angle 8 = 36°$

$\angle 3 = \angle 5$ (Alternate interior angle)

$\angle 5 = 144°$

$\angle 2 = \angle 6$ (Alternate interior angle)

$\angle 2 = 36°$

$\angle 2 = \angle 4$ (Vertically opposite angle)

$\angle 4 = 36°$

$\angle 5 = \angle 7$ (Vertically opposite angle)

$144° = 144°$

$\angle 7 = 144°$

7. $\angle 5 = 75°$

$\angle 3 = \angle 5$ (Alternative interior angle)

$\angle 3 = 75°$

$\angle 5 = \angle 7$ (Vertically opposite angle)

$\angle 7 = 75°$

$\angle 3 = \angle 6 = 180°$ (Sum of co-interior angle)

$\angle 6 + 75° = 180°$ $\angle 6 + 75° = 180°$

$\angle 6 = 105°$

$\angle 6 = \angle 4$ (Alternate interior angle)

$\angle 4 = 105°$

$\angle 3 = \angle 1$ (Vertically opposite angle)

$\angle 1 = 75°$

$\angle 4 = \angle 2$ (Vertically opposite angle)

$\angle 2 = 105°$

$\angle 8 = \angle 10$ (Alternate interior angle)

$\angle 10° = 105°$

$\angle 10 = \angle 12$ (Vertically opposite angle)

$\angle 12 = 105°$

$\angle 7 = \angle 9$ (Alternate interior angle)

$\angle 9 = 75°$

$\angle 9 = \angle 11$ (Vertically opposite angle)

$\angle 11 = 75°$

8. Let the angle with 80° be x

$x + 80° = 180°$ (Straight angle)

$x = 100°$

$\angle x = \angle a$ (Alternative interior angle)

$\angle a = 100°$

Let the co-interior angle with 60° be y

$60° + y = 180°$ (Sum of co-interior angle)

$\angle y = 180° - 60°$ $y = 120°$

$\angle y = \angle b$(Vertically opposite angle)

$\angle b = 120°$

9. (a) l is parallel to m because

$180° - 130° = 50°$

$50° = 50°$ Hence Prove

(b) l and m are not parallel to each other because

$\angle 89° \neq 90°$ Hence Prove

(c) l and m are not parallel to each other because alternate interior are not same.

(d) l is parallel to m because

$180° - 100° = 80°$

$80° = 80°$ Hence Prove

10. In the given figures $l \| m$. Find the value of x in each of the following:

(a) $(x + 50°) + x = 180°$ (Co-interior angle)

$x + 50° + x = 180°$

$2x + 50 = 180°$

$2x = 180° - 50°$ $2x = 30°$

$x = 15°$

$x + 50° = 15° + 50°$

$x + 50° = 65°$

(b) $6x + 4x = 180°$ (Sum of Co-interior angle)

$10x = 180°$ $x = 18°$

$6x = 6 \times 18 = 6x = 108°$

$4x = 4 \times 18° = 4x = 72°$

11. $x + 120° = 180°$

(Sum of co-interior angle)

$x = 180° - 120°$ $x = 60°$

$\angle x = \angle y$

(Alternate exterior angle)

$\angle y = 60°$

12. $\angle BEC + 120° = 180°$

$\angle BEC = 180° - 120°$

$\angle BEC = 70°$

Multiple Choice Question:

1. b **2.** b **3.** c **4.** b **5.** b

True or False

1. False **2.** True **3.** True **4.** False

5. True

Chapter-6

Exercise-6.1

1. The measure of angles of triangles are given state whether they can from a triangle or not:

(a) Yes (b) No (c) Yes (d) Yes (e) Yes (f) No

2. Write the name of triangle when angle are given below:

(a) Right angled

(b) Obtuse angled

(c) Acute angled

(d) Obtuse angled

(e) Right angled (f) Acute angled

3. The measure of sides of triangle are given below classify them on the basis of sides:

(a) Equilateral triangle

(b) Isosceles triangle

(c) Isosceles triangle

(d) Scalene triangle

(e) Isosceles triangle

(f) Equilateral triangle

4. Two angles of a triangle are given below. Find the third angle of the triangle:

(a) 55°, 75°

Sum of angle of triangle is 180°

$55°+75° = x = 180°$
$130°+x = 180°$
$x = 180°–130°$ $x = 50°$
(b) $70°, 60°$
Sum of angle of triangle is 180°
$70°+60° = x = 180°$
$130°+x = 180°$
$x = 180°–130°$ $x = 50°$
(c) $90°, 30°$
Sum of angle of triangle is 180°
$90°+30° = x = 180°$
$120°+x = 180°$
$x = 180°–120$ $x = 60°$
(d) $125°, 30°$
Sum of angle of triangle is 180°
$125°+30° = x = 180°$
$155°+x = 180°$
$x = 180°–155°$ $x = 25°$
(e) $130°, 10°$
Sum of angle of triangle is 180°
$130°+10° = x = 180°$
$140°+x = 180°$
$x = 180°–140°$ $x = 40°$
(f) $45°, 75°$
Sum of angle of triangle is 180°
$45°+75° = x = 180°$
$120°+x = 180°$
$x = 180°–120°$ $x = 60°$
(g) $45°, 90°$
Sum of angle of triangle is 180°
$45°+90° = x = 180°$
$135°+x = 180°$
$x = 180°–135°$ $x = 45°$
(h) $60°, 60°$
Sum of angle of triangle is 180°
$60°+60° = x = 180°$
$120°+x = 180°$
$x = 180°–120°$ $x = 60°$

5. Let the angle be x
Sum of angle of triangle is 180°
$x + x + 45° = 180°$
$2x + 45° = 180°$
$2x = 180° – 45°$
$2x = 135°$ $x = 67.5$

6. $\angle D + \angle O + \angle B = 180°$
(Angle of sum of triangle)
$60°+\angle O + 85° = 180°$
$145°+\angle O = 180°$
$\angle O = 180°–145° \angle O = 35°$
$\angle A + \angle C + \angle O = 180°$
(Angle of sum of triangle)
$65°+ y + 35° = 180°$
$y + 100 = 180°$
$y = 180°–100°$ $y = 80°$
$\angle O = 180°–145° \angle O = 35°$
$\angle A + \angle C + \angle O = 180°$
(Angle of sum of triangle)
$65°+ y + 35° = 180°$
$y + 100 = 180°$
$y = 180°–100°$ $y = 80°$

7. $\angle x = 80°$
(Alternate exterior angle)
$\angle y = 60°$
(Alternate exterior angle)
$\angle D + x + z = 180°$
(Sum of angle of triangle)
$60°+80°+x = 180°$
$140°+z = 180°$
$z = 180°–140°$ $z = 40°$

8. $80°+60°+z = 180°$
(Sum of angle of triangle)
$140°+z = 180°$
$z = 180°–140°$ $z = 40°$
$60°+x = 180°$ (Straight angle)
$x = 180°–160°$ $x = 120°$
$y + x + 30° = 180°$
$y + 120°+30° = 180°$ $y = 30°$

9. $\angle A + \angle B + \angle C = 180°$
(Sum of angle of triangle)
$50°+60°+\angle C = 180°$
$110°+\angle C = 180°$
$\angle C = 180°–110° \angle C = 70°$
$\angle D + \angle E + \angle C = 180°$
$80°+\angle E + 70° = 180°$
$150°+\angle E = 180°$
$\angle E = 180°–150° \angle E = 30°$
$\angle G + \angle E + \angle F = 180°$
$70°+30° \angle F = 180°$

$100° + \angle F = 180° \angle F = 180°$

10. True or False

(a) False (b) True (c) False

(d) True (e) False (f) False

11. Find the third angle each triangle. What do you conclude?

(a) $\angle B + \angle C + \angle A = 180°$

$70° + 55° + \angle A = 180°$

$125° + \angle A = 180°$

$\angle A = 180° - 125°$ $\angle A = 55°$

In isosceles triangle-two angle are of equal measure

(b) $\angle A + \angle B + \angle C = 180°$

(Sum of angle of triangle)

$60° + 60° + \angle A = 180°$

$120° + \angle A = 180°$

$\angle A = 180° - 120°$ $\angle A = 60°$

In equivalent are three angles of equal measure

Exercise-6.3

1. In the following figures, write the name of exterior angle(s) of the triangles:

(a) $\angle DBA, \angle ECB$

(b) $\angle ACD$ (c) $\angle QRS$

(d) $\angle ACD, \angle BAE, \angle CBF$

(e) $\angle DAC, \angle ECA$ (f) $\angle ACD$

2. In the following figures. Find the value of x and y, z where applicable:

(a) $x + \angle B + \angle A = 180°$

$x + 60° + 50° = 180°$

$x + 110° = 180°$

$x = 180° - 110°$ $x = 70°$

$x + y = 180°$ (Straight angle)

$70° + y = 180°$

$y = 180° - 70°$ $y = 110°$

(b) $\angle A = 180° - 120°$

$\angle A = 60°$

$\angle B + \angle A + \angle C = 180°$

(Sum of angle of triangle)

$80° + 60° + x = 180°$

$140° + x = 180°$

$x = 180° - 140°$ $x = 40°$

(c) $x + 120° = 180°$(Straight angle)

$x = 180° - 120°$ $x = 60°$

$\angle EAC + \angle CAF = 180°$

(Straight angle)

$y + 50° = 180°$

$y = 180° - 150°$ $y = 130°$

$z + 70° = 180°$ (Straight angle)

$z + 180° - 70°$ $z = 110°$

(d) Let the one angle of a triangle be y

$90° + 130° + y = 180°$

$120° + y = 180°$

$y = 180° - 120°$ $y = 60°$

$x + 60° = 180°$ (Straight angle)

$x = 180° - 160°$ $x = 120°$

(e) $50° + 65° + y = 180°$

(Sum of angle of triangle)

$115° + y = 180°$

$y = 180° - 115°$ $y = 65°$

$65° + x = 180°$ (Straight angle)

$x = 180° - 65°$ $x = 115°$

3. $\angle A + \angle B + \angle O = 180°$

$90° + 30° + a = 180°$

$120° + a = 180°$

$a = 180° - 120°$ $x = 60°$

$\angle a = \angle b$

(Sum of angle of triangle)

$60° = 60°$ $\angle a = 60°$

$\angle a + \angle b + \angle c = 180°$

(Sum of angle of triangle)

$c + 60° + 90° = 180°$

$c + 150° = 180°$ $c = 180° - 150°$

$c = 30°$

4. $\angle ACD = \angle BAC + \angle ABC$

$\angle BAE = \angle ABC + \angle BCA$

$\angle CBF = \angle CAB + \angle ACB$

5. $x + 110° = 180°$

$x = 180° - 110°$ $x = 70°$

$\angle ABC = ACB$ (Sides are equal)

$y = 70°$

$x + y + z = 180°$

(Sum of angle of triangle)

$70° + 70° + z = 180°$

$140° + z = 180°$

$z = 180° - 140°$ $z = 40°$

6. $\angle ACB + \angle ACD = 180°$

$\angle ACB + 60° = 180°$

$\angle ACB = 180° - 60°$

$\angle ACB = 120°$

$\angle ABC + \angle ABE = 180°$

$\angle ABE + 130° = 180°$

$\angle ABC = 180° - 130°$

$\angle ABC = 50°$

$\angle ACB + \angle ABC + \angle BAC = 180°$

(Sum of angle of triangle)

$120° + 50° + x = 180°$

$170° + x = 180°$

$x = 180° - 170°$ $\quad$ $x = 10°$

7. Such of exterior angle = Twice sum of interior angle

8. $\angle EAC + \angle BAC = 180°$

(Straight angle)

$\angle EAC + 70° = 180°$

$\angle EAC = 180° - 70°$

$\angle EAC = 110°$

$\angle ABC + \angle ABD = 180°$

(Straight angle)

$\angle ABC + 110° = 180°$

$\angle ABC = 180° - 110°$

$\angle ABC = 70°$

$\angle BAC + \angle ABC + \angle ACB = 180°$

(Sum of angle of triangle)

$70° + 70° + \angle ACB = 180°$

$140° + \angle ACB = 180°$

$\angle ACB = 180° - 140°$

$\angle ACB = 40°$

$\angle BAE + \angle BAC = 180°$

(Straight angle)

$\angle BAE + 70° = 180°$

$\angle BAE + 180° - 70°$

$\angle BAE = 110°$

9. State whether the following sides are of a triangle or nor:

(a) Yes $\quad$ (b) Yes $\quad$ (c) No

(d) Yes $\quad$ (e) No $\quad$ (f) Yes

10. Interior angle 45°, 45 exterior angles, 90°, 135°, 135°

11. Interior angle = 60° each

Exterior angle = 120° each

Exercise-6.3

1. Find the length of hypotenuse of the following right triangles:

(a) $(AB)^2 + (BC)^2 = (CA)^2$

$(7)^2 + (24)^2 = (CA)^2$

$49 + 576 = (CA)^2$

$625 = (CA)^2$

$CA = \sqrt{625}$ $\quad$ CA = 25 cm

(a) $(PR)^2 + (PR)^2 = (QR)^2$

$(15)^2 + (8)^2 = (RQ)^2$

$225 = (RQ)^2$

$289 = (RQ)^2$

RQ = 17 cm

(c) $(DE)^2 + (EF)^2 = (DF)^2$

$(5)^2 + (12)^2 = (DF)^2$

$25 + 144 = (DF)^2$

$169 = (DF)^2$

DF = 13 cm

(d) $(XY)^2 + (YZ)^2 = (XZ)^2$

$(8)^2 + (6)^2 = (XZ)^2$

$64 + 36 = (XZ)^2$

$100 = (XZ)^2$

XZ = 10 cm

2. Check wheather the following triplets are Pythagorean or not:

(a) (7, 24, 25)

We have

$(7)^2 + (24)^2$

$= 49 + 576 = 625$

$(7)^2 + (24)^2 = (25)^2$

$\therefore$ (7, 24, 25) are Pythagorean triplet

(b) (5, 12, 13)

We have

$(5)^2 + (12)^2$

$= 25 + 144 = 169$

$(5)^2 + (12)^2 = (13)^2$

$\therefore$ (5, 12, 13) are Pythagorean triplet

(c) (3, 4, 6)

We have

$(3)^2 + (4)^2$

$= 9 + 16 = 5$

$(1)^2 + (2)^2 \neq (3)^2$

$\therefore$ (1,2,3) are not Pythagorean triplet

(d) (8, 15, 17)

We have

$(8)^2 + (15)^2$

$= 64 + 225 = 289$

$(8)^2 + (15)^2 = (17)^2$

$\therefore$ (8, 15, 17) are Pythagorean triplet

(e) (10, 10, 20)

We have

$(10)^2 + (10)^2$

$= 100 + 100 = 200$

$(10)^2 + (10)^2 \neq (20)^2$

$\therefore$ (10, 10, 20) are Pythagorean triplet

3. In the following right triangle find the missing sides:

(a) Using Pythagorean triplet

$(3)^2 + (4)^2 = (x)^2$

$= 9 + 16 = (x)^2$

$25 = (x)^2 \qquad x = 5\text{ cm}$

(b) $(8)^2 + (x)^2 = (17)^2$

$= 64 + x^2 = 289$

$x^2 = 289 - 64$

$x^2 = 225 \qquad x = 15\text{ cm}$

(c) $(24)^2 + (x)^2 = (25)^2$

$= 576 + x^2 = 625$

$x^2 = 625 - 576$

$x^2 = 49 \qquad x = 7\text{ cm}$

4. In the diagonals of rectangles whose length and breadths are give below:

(a) Using Pythagorean triplet

$(21)^2 + (20)^2 = (\text{diagonal})^2$

$441 + 400 = (\text{diagonal})^2$

$841 = (\text{diagonal})^2$

diagonal = 24 cm

(b) Let the diagonal be x

Using Pythagorean triplet

$(8)^2 + (6)^2 = (x)^2$

$64 + 36 = (x)^2$

$100 = (x)^2 \qquad x = 10\text{ cm}$

(c) Let the diagonal be x

Using Pythagorean triplet

$(5)^2 + (12)^2 = (x)^2$

$25 + 144 = (x)^2$

$169 = (x)^2$

$x = 13\text{ cm}$

5. The altitude and base of isocels triangle are same

Let the diagonal be x

$(x)^2 + (x)^2 = 512$

$2x^2 = 512 \qquad x^2 = \frac{512}{2}$

$x^2 = 256 \qquad x = 16$

6. Let the length of a ladder be x

$(8)^2 + (15)^2 = (x)^2$

$64 + 225 = (x)^2$

$289 = x^2 \qquad x = 17\text{ cm}$

Length of ladder is 17 cm

7. Using Pythagorean Triplet

$(5)^2 + (12)^2 = (x)^2$

$25 + 144 = x^2$

$169 = x^2 \qquad x = 13\text{ cm}$

Distance between starting point to final point is 13 m

Length of ladder is 17 cm

8. In ΔABC

Using Pythagorean triplet

$(AC)^2 + (CD)^2 = (AD)^2$

$x^2 + (6)^2 = (10)^2$

$x^2 = 100 - 36$

$x^2 = 64 \qquad x = 8\text{ cm}$

In ΔACB

$(AC)^2 + (CB)^2 = (AB)^2$

$(8)^2 + (15)^2 \neq y^2$

$64 + 225 = y^2 \qquad y = 17\text{ cm}$

9. In ΔABC

$(15)^2 + (x)^2 = (17)^2$

$225 + x^2 = 289$

$x^2 = 289 - 225$

$x^2 = 64 \qquad x = 8\text{ m}$

$\therefore$ the distant between their fat is 8 cm

10. Find the value of x if they are Pythagorean triplet:

(a) $(3, 4, x)$

$(3)^2 + (4)^2 = x^2$

$25 = x^2 \qquad x = 5$

(b) $(x, 6, 10)$

$(x)^2 + (16)^2 = (10)^2$

$x^2 + 36 = 100$

$x^2 = 100 - 36$

$x^2 = 64 \qquad x = 8$

(c) $(5, x, 13)$

$(5)^2 + (x)^2 = (13)^2$

$25^2 + x^2 = 169$

$x^2 = 169 - 25$

$x^2 = 144 \qquad x = 25$

(d) $(7, 24, x)$

$(7)^2 + (24)^2 = (x)^2$

$49 + 576 = x^2$

$49 + 576 = x^2$

$525 = x^2 \qquad x = 25$

(e) $(16, x, 20)$

$(16)^2 + (x)^2 = (20)^2$

$256 + x^2 = 400$

$x^2 = 400 - 256$

$x^2 = 144 \qquad x = 12$

(f) $(x, 20, 29)$

$(x)^2 + (20)^2 = (29)^2$

$x^2 + 400 = 841$

$x^2 = 841 - 400$

$x^2 = 441 \qquad x = 21$

Multiple choice question:

1. b **2.** c **3.** c **4.** c **5.** b

NCERT CORNER

Fill in the blanks:

1. Greater

2. Obtuse angle triangle 3. 40°

4. 3,3,3

True and False:

1. False **2.** True **3.** True **4.** True

5. True

Chapter -7

Exercise 7.1

1. Fill in the blanks:

(a) Their length are equal

(b) They are of equal measure

(c) Their sides are of equal length

(d) Their lengths and breadths are equal

(e) Their radius are equal

2. Which of line segments are congruent: (Measure and state)

(a) a is congruent to e

(b) b is congruent to d

(c) This is not congruent to any line

(d) This is congruent to b

(e) This is congruent to a

(f) This is not congruent to any line

3. Which of the angles are congruent: (Measure state)

(a) This angel is congruent to f.

(b) This angel is congruent to d.

(c) This angel is congruent to e.

(d) This angel is congruent to b.

(e) This angel is congruent to c.

(f) This angel is congruent to a.

4. Which of the line segments are congruent in following figures:

(a) $AB = BC = CD = DA$

(b) $AB = CD and AO = BC$

(c) $AB = BC = CA$

(d) $OA = OB = OC$

5. $\angle AOD = \angle BOD$

$\therefore \angle AOD \cong BOC$

6. $\overline{AC} = \overline{BD}$ (Same Length)

$\therefore \overline{AB} \cong \overline{CD}$

7. $\overline{AC} = \overline{BD}$(Same Length)

$\therefore \overline{AB} \cong \overline{CD}$

8. True and False:

(a) False (b) False (c) False

(d) True (e) True (f) True

Exercise 7.2

1. State Whether of the following pairs of triangle are congruent. Also, state the conditions satisfied in case:

(a) $AC = DD$(Given)

$BC = EF$ (Given)
$\angle ACB = \angle DEF$ (Given)
$\therefore \Delta ABC \cong \Delta DEF$
(By SAS Property)

(b) $AB = EF$ (Given)
$AC = FD$ (Given)
$\angle ABC = \angle FED (90°)$
$\therefore \Delta ABC \cong \Delta DEF$
(By RHS Property)

(c) $\angle P = \angle M$ (Given)
$\angle R = \angle N$ (Given)
$\angle QR = \angle ON$ (Given)
$\therefore \Delta PQR \cong \Delta M$ON
(By SAS Property)

(d) $AB = XY$ (Given)
$AC = XZ$ (Given)
$\angle C = \angle Z$ (Given)
$\therefore \Delta ABC \cong \Delta XYZ$
(By SAS Property)

(e) $AB = AD$ (Given)
$BC = DZ$ (Given)
$AC = AC$ (Common)
$\therefore \Delta ABC \cong \Delta ADC$
(By SSS Property)

(f) $AC = CE$ (Given)
$BC = CD$ (Given)
$AC = ED$ (Given)
$\therefore \Delta ACB \cong \Delta DCE$
(By SSS Property)

2. Without clearing the triangle state the correspondence between the sides and angles in the following cases:

(a) $\Delta ABC \cong \Delta DEF$
$AB = DE$ $\quad$ $BC = EF$
$\angle B = \angle E$
By SAS Property of congruence

(b) $\Delta ABC \cong \Delta EFD$
$AB = EF$ $\quad$ $BC = FD$
$AC = ED$
By SSS Property of congruence

(c) $\Delta ABC \cong \Delta FDE$
$AB = FD$ $\quad$ $BC = DE$
$\angle B = \angle D$
By SAS Property of congruence

3. State true or false if $\Delta PQR \cong \Delta XYZ$

(a) False (b) False (c) True
(d) False (e) True (f) False

4. $\overline{PQ}$ and $\overline{RS}$ bisect each other at O. Which statement is true:

(a) True (b) True (c) True
(d) True

5. In ΔACB and ΔADC
$\overline{AC} = \overline{AD}$ (Given)
$\overline{BD} = \overline{CB}$ (Given)
$\overline{AB} = \overline{AB}$ (Common)
By SSS property
$\Delta ACB \cong \Delta ADB$ $\quad$ Hence proved

6. In ΔABD and ΔADC
$\overline{AB} = \overline{AC}$ (Given)
$\overline{BD} = \overline{DC}$ (AD between BC)
$\overline{AD} = \overline{AD}$ (Common)
By SSS property of congruence
$\Delta ABD \cong \Delta ADC$ Hence proved

7. (a) In ΔAOC and ΔBOD
$\overline{AO} = \overline{OB}$ (Given)
$\angle A = \angle B$ (Given)
$\angle AOC = BOD$
(Vertically opposite angle)
By ASA property of congruence
$\Delta AOC \cong \Delta BOD$ $\quad$ Hence proved

(b) By CPCT Property
$\angle AOC = \angle BDO$

(c) By CPCT Property
$\overline{AC} = \overline{BD}$ $\quad$ Hence Proved

8. (a) On ΔACD and ΔABD
$\angle CAD = \angle BAD (A \times \text{bisect } \angle A)$
$\angle CDA = \angle BDA (A \times \text{bisect } \angle D)$
$AD = AD$ (Common)
By ASA property of congruent
$\Delta ACD \cong \Delta ABD$

(b) $\Delta ACD \cong \Delta ABC$
$\therefore$ by $CPCT$
$\angle C = \angle B$ $\quad$ Hence Proved

(c) $\Delta ACD \cong \Delta ABC$
$\therefore$ by $CPCT$
$CD = BD$ $\quad$ Hence Proved

(d) $\Delta ACD \cong \Delta ABC$

$\therefore$ by $CPCT$

$AC = AB$ Hence Proved

9. In rhombus

In $\Delta ACD \& \Delta ABC$

$AB = CD$ (sides of rhombus is equal

$AD = BC$ (sides of rhombus is equal

$AC = AC$ (Common)

By SSS property of congruent

$\Delta ACD \cong \Delta ABC$

Hence, diagonal of rhombus divide rhombus in equal congruent Δ.

10. There are four criterias of congruency:

(i) By SSS property (side - side - side) (ii) By SAS property (side - angle - side) (iii) By ASA property (angle - side - angle) (iv) By RHS property (right angle hypotenuse - side)

Multiple choice Questions:

1. c **2.** b **3.** d **4.** d **5.** c

NCERT CORNER:

Fill in the blanks:

1. Their radius are equal

2. Their lengths and breadth are equal

3. They are of equal length

4. They are of equal measure

True and False:

1. False **2.** True **3.** True **4.** True

Chapter-8

Chapter - 8.1

1. Express the following ratios in the simplest from:

(a) 12:32

$\frac{12}{32} = \frac{3}{8} = 3:8$

(b) $\frac{40}{48} = 5:6$

(c) 112:224 $\frac{112}{224} = 3:6$

(d) 72:96 $\frac{72}{96} = 3:4$

2. Express the following as ratios:

(a) 6 kg to 10 kg

$\frac{5}{10} = 1:2$

(b) 24 hours to 36 hours

$\frac{24}{36} = 2:3$

(c) ₹500 to ₹1500

$\frac{500}{1500} = 1:3$

(d) 100 km to 150 km

$\frac{100}{150} = 2:3$

(e) 250 g to 50 g

$\frac{250}{50} = 5:1$

3. Express the following ratios in the simplest form:

(a) 3 hrs to 120 minutes

1 min = $\frac{1}{60}$ hrs

120 min = $\frac{120}{60}$ = 2 hrs

Ratio = $\frac{3}{2} = 3:2$

(b) ₹ 2 to 50 paise

₹ 1 = 100 paise

₹ 3 = 200 paise

Ratio = $\frac{200}{5} = 4:1$

(c) 2 kg to 1500 g 1 kg = 1000 g

2 kg = 2000 g

Ratio = $\frac{2000}{1500} = 4:3$

(d) 5 m to 200 m

1 m = 100 cm

5 m = 500 cm

Ratio = $\frac{500}{200} = 5:2$

(e) 1500 m to 3 km

1 km = 1000 m

3 km = 3000 m

$\text{Ratio} = \frac{1500}{3000} = 1:2$

4. No. of boys = 48

No. of girls = 36

$\text{Ratio} = \frac{48}{36}$

Ratio boy to girl = 4 : 3

5. Length of a room = 480 cm

Breadth of a room = 360 cm

$\text{Ratio} = \frac{480}{360}$

Ratio between length to breadth = 4 : 3

6. Side of rectangular field = 7:9

Perimeter of rectangle = 288 m

Perimeter = 2 (l + b)

$288 = 2(7x + 9x)$

$288 = 14x + 18x$

$288 = 32x$

$x = \frac{288}{32} \qquad x = 9$

$\text{Length} = 7 \times 9 = 63m$

$\text{Breadth} = 9x = 9 \times 9 = 81m$

7. Supplementary angles = 3 : 2

Sum of supplementary angles $= 180°$

$3x + 2x = 180°$

$5x = 180°$

$x = \frac{180}{5} \qquad x = 36$

1st angle $= 3x = 3 \times 36 = 108°$

2nd angle $= 2x = 2 \times 36 = 72°$

8. Complementary angles = 5:4

Sum of complementary angles $= 90°$

$5x + 4x = 90°$

$9x = 90° \qquad x = 10$

1st angle $= 5 \times 10 = 50°$

2nd angle $= 4 \times 10 = 40°$

9. Ratio = 5 : 3 : 4 : 3

$5x, 3x, 4x, 3x$

$5x + 3x + 4x + 3x = 1500$

$15x = 1500$

$x = \frac{1500}{15} \qquad x = 100$

$5x = 5 \times 100 = 500$

$3x = 3 \times 100 = 300$

$4x = 4 \times 100 = 400 3x = 3 \times 100 = 300$

10. Ratio of numerator and denominator = 3:2

Of 3 is added to numerator and 2 is subtracted from denominator

$(3x + 3):(2x - 2)$

then, $(3x + 3):(2x + 2)::9:4$

$4(3x + 3) = 9(2x - 2)$

$12x - 18 = (18x - 18)$

$12x - 18x = -18 - 12$

$-6x = -30$

$x = \frac{30}{6} \qquad x = 5$

$\text{Numerator} = 3 \times 5 = 15$

$\text{Denominator} = 2 \times 5 = 10 = \frac{15}{10}$

Exercise 8.2

1. Which ratio is greater:

(a) 3 : 5 or 4 : 18

$\frac{3}{5} or \frac{4}{18}$

L.C.M of 5 and 18 is 90

$\frac{3}{5} \times \frac{18}{18} = \frac{54}{90} \qquad \frac{4}{18} \times \frac{5}{5} = \frac{20}{90}$

$3:5 > 4:18$

(b) 6:7 or 12:14

$\frac{6}{7} or \frac{12}{14}$

L.C.M of 7 and 14 is 14

$\frac{6}{7} \times \frac{2}{2} = \frac{12}{14} \qquad \frac{12}{14} \times \frac{1}{1} = \frac{12}{14}$

$6:7 = 12:14$

(c) 2 : 3 or 8 : 15

$\frac{2}{3} or \frac{8}{15}$

L.C.M of 3 and 15 is 15

$\frac{2}{3} \times \frac{5}{5} = \frac{10}{15} \qquad \frac{8}{15} \times \frac{1}{1} = \frac{8}{15}$

$2:3 > 8:15$

2. Write the equivalent ratios to the

following ratios:

(a) 1 : 3

$\frac{1}{3}\times\frac{2}{2}=\frac{2}{6}\Rightarrow 2:6$

$\frac{1}{3}\times\frac{3}{3}=\frac{3}{9}\Rightarrow 3:9$

$\frac{1}{3}\times\frac{4}{4}=\frac{4}{12}\Rightarrow 4:16$

(b) 2 : 5

$\frac{1}{3}\times\frac{2}{2}=\frac{2}{6}\Rightarrow 2:6$

$\frac{1}{3}\times\frac{3}{3}=\frac{3}{9}\Rightarrow 3:9$

$\frac{1}{3}\times\frac{4}{4}=\frac{4}{12}\Rightarrow 4:16$

(c) 5 : 9

$\frac{5}{9}\times\frac{2}{2}=\frac{10}{18}\Rightarrow 10:18$

$\frac{5}{9}\times\frac{3}{3}=\frac{15}{27}\Rightarrow 15:27$

$\frac{5}{9}\times\frac{4}{4}=\frac{20}{36}\Rightarrow 20:36$

(d) 15:30

$\frac{15}{30}\times\frac{2}{2}=\frac{30}{60}\Rightarrow 30:60$

$\frac{15}{30}\times\frac{3}{3}=\frac{45}{90}\Rightarrow 45:90$

$\frac{15}{30}\times\frac{4}{4}=\frac{60}{120}\Rightarrow 60:120$

3. Are the following ratios equivalent:

(a) 2:3 and 6:9

$\frac{2}{3}$ and $\frac{6}{9}$

L.C.M of 3 and 9 is 9

$\frac{2}{2}\times\frac{3}{3}=\frac{6}{9}$ $\quad$ $\frac{6}{9}\times\frac{1}{1}=\frac{6}{9}$

$\therefore$ 2 : 3 and 6 : 9 are equivalent

(b) 3 : 9 and 18 : 49

$\frac{3}{9}$ and $\frac{18}{49}$

L.C.M of 9 and 49 is 441

$\frac{3}{9}\times\frac{49}{49}=\frac{147}{441}$ $\quad$ $\frac{18}{49}\times\frac{9}{9}=\frac{162}{441}$

3:9 and 18:49 are not equivalent

(c) 15:30 and 1:2

$\frac{15}{30}$ and $\frac{1}{2}$

L.C.M of 30 and 2 is 30

$\frac{15}{30}\times\frac{1}{1}=\frac{15}{30}$ $\quad$ $\frac{1}{2}\times\frac{15}{15}=\frac{15}{30}$

15:30 and 1:2 are equivalent

(d) 16:18 and 96:126

$\frac{16}{18}$ and $\frac{96}{126}$

L.C.M of 18 and 126 is 126

$\frac{16}{18}\times\frac{7}{7}=\frac{112}{126}$ $\quad$ $\frac{96}{126}\times\frac{1}{1}=\frac{96}{126}$

18:16 and 96:126 are not equivalent

4. Fill in the blanks:

(a) 45 (b) 15 (c) 12 (d) 33 (e) 7

(f) 20

Chapter - 8.3

1. Which of the following are in proportion:

(a) 2 : 5, 12 : 30

$=\frac{2}{5}\times\frac{12}{30}$

$= 2 \times 30 = 12 \times 5$

$= 60 = 60$

Hence they are in proportion

(b) 5, 15, 6, 20

2 : 5, 12 : 30

$=\frac{5}{15}\times\frac{6}{20} = 5 \times 20 = 6 \times 15$

$= 100 \neq 90$

Hence they are not in proportion

(c) 40, 50, 50, 40

40 : 50, 40 : 50

$=\frac{40}{50}\times\frac{50}{40}$

$= 40 \times 40 = 50 \times 50$

$= 1600 \neq 2500$

Hence they are not in proportion

2. Find *x* in the following proportions:

(a) $4 : 8 :: 20 : x$

$\frac{4}{8} \times \frac{20}{x}$ $\quad 4 \times x = 20 \times 8$

$4x = 160$

$x = \frac{160}{4}$ $\quad x = 40$

(b) $10 : 15 :: x : 45$

$\frac{10}{15} \times \frac{x}{45}$ $\quad 10 \times 45 = 15x$

$450 = 15x$

$x = \frac{450}{15}$ $\quad x = 30$

(c) $12 : x :: 9 : 12$

$\frac{12}{x} \times \frac{9}{12}$ $\quad 12 \times 12 = 9x$

$144 = 9x$

$x = \frac{144}{9}$ $\quad x = 16$

(d) $x : 40 :: 20:100$

$\frac{x}{40} \times \frac{20}{100}$ $\quad 100x = 800$

$x = \frac{800}{100}$ $\quad x = 8$

3. Let the amount of boxes be *x*:

(a) $1:177 :: x : 885$

$\frac{1}{177} \times \frac{x}{885}$ $\quad 177x = 885$

$x = 5$

No. of box = 5

4. Scale of map = 1:800,000

A part on the map = 20 cm

$1:80000 :: 20:x$

$\frac{1}{800000} \times \frac{20}{x} x = 16000000$

Actual distance = 16,000,000

5. Ratio of income and savings = 5:2

Total saving =₹12000

Income : Savings : : Income Saving

$5 : 2 :: x : 12000$

$\frac{5}{2} \times \frac{x}{12000}$ $\quad 5 \times 12000 = 2x$

$60000 = 2x$ $\quad x = 30000$

Income =₹30000

6. Let the cost of 18 copies be x

Number of copies : cost : : No. of copies : cost

$55 : 220 :: 18 : x$

$\frac{55}{220} \times \frac{18}{x}$ $\quad 55x = 220 \times 18$

$55x = 3960$ $\quad x = 72$

Cost =₹72

7. Let the third term be x

1st term : 2nd term : : 3rd term : 4th term

$30:45 :: x:60$

$\frac{30}{45} \times \frac{x}{60}$ $\quad 30 \times 60 = 45x$

$1800 = 5x$ $\quad x = 40$

Third term = 40

8. $45, x, x, 5$ $\quad 45 : x :: x : 5$

$\frac{45}{x} \times \frac{x}{5}$ $\quad 45 \times 5 = x^2$

$225 = x^2$ $\quad x = \sqrt{225}$

$x = 15$

9. Let the second term be x

1st term : 2nd term : : 3rd term : 4th term

$12 : x :: 8 : 14$

$\frac{12}{x} \times \frac{8}{14}$ $\quad 12 \times 14 = 8x$

$168 = 8x$ $\quad x = \frac{168}{8}$ $\quad x = 21$

Second term = 21

10. Find value of *x* in each of the following:

(a) $18 : x :: x : 2$

$\frac{18}{x} \times \frac{x}{2}$ $\quad 18 \times 2 = x^2$

$36 = x^2$ $\quad x = 6$

(b) $20 : x :: x : 5$

$\frac{20}{x} \times \frac{x}{5}$ $\quad 20 \times 5 = x^2$

$100 = x^2$ $\quad x = \sqrt{100}$

$x = 10$

(c) $x : 24 :: 24 : 16$

$\frac{x}{24} \times \frac{24}{16}$ $\quad 16x = 24 \times 24$

$16x = 576$ $\quad x = 36$

(d) $36 : x :: 28 : 63$

$\frac{36}{x} \times \frac{28}{63}$ $\quad 36 \times 63 = 28x$

$2268 = 28x$

$x = \frac{2268}{28} x = 81$

Exercise 8.4

1. Express each of the following percent as fraction:

(a) 20% $\quad \frac{20}{100} = \frac{1}{5}$

(b) 35% $\quad \frac{35}{100} = \frac{7}{20}$

(c) $12\frac{1}{2}$ $\quad = \frac{25}{2}\%$

$= \frac{\frac{25}{2}}{100} = \frac{25}{200} = \frac{1}{8}$

(d) $3\frac{1}{3}$ $\quad = \frac{10}{3}\%$

$= \frac{\frac{10}{3}}{100} = \frac{10}{300} = \frac{1}{30}$

2. Express each of the following fraction as a percent:

(a) $\frac{2}{5}$ $\quad = \frac{2}{5} \times 100 = 40\%$

(b) $\frac{3}{25} \times 100 = 12\%$

(c) $1\frac{1}{4}$

$= 1\frac{1}{4} = \frac{5}{4} \times 100 = 125\%$

(d) $5\frac{1}{6}$

$5\frac{1}{6} = \frac{31}{6} \times 100 = \frac{3100}{6} = 516.6\%$

3. Express each of the following ratios as percent:

(a) 2 : 5 $\quad = \frac{2}{5} \times 100 = 40\%$

(b) 3 : 100 $\quad = \frac{3}{100} \times 100 = 3\%$

(c) 11:50 $\quad = \frac{11}{50} \times 100 = 22\%$

(d) 15:30 $\quad = \frac{15}{30} \times 100 = 50\%$

4. Express each of the following percent as decimals:

(a) 25% $\quad = \frac{25}{100} = 0.25$

(b) 12.5% $\quad = \frac{12.5}{1000} = 0.125$

(c) 50% $\quad = \frac{50}{100} = \frac{1}{2} = 0.5$

(d) 75% $\quad = \frac{75}{100} = 0.75$

5. Express each of the following decimals as percent:

(a) 0.25 $\quad = \frac{0.25}{100} \times 100 = 25\%$

(b) $\frac{1.50}{100} \times 100 = 150\%$

(c) $\frac{2.35}{100} \times 100 = 235\%$

(d) $\frac{6.25}{100} \times 100 = 625\%$

6. Find the following:

(a) 20% of 140

$= \frac{20}{100} \times 140 = 28$

(b) 10% of 7180

$= \frac{10}{100} \times 7180 =$ ₹718

(c) $2\frac{1}{2}$% of ₹100

$= \frac{5}{2} \times 100 =$ ₹2.5

(d) 25% of 1 kg

$= \frac{25}{100} \times 1\frac{1}{4} = 0.25$kg

(e) 12.5% of 5 m

$= \frac{12.5}{100} \times 5\frac{125}{200} = 0.625$m

(f) 25% of 1 Quintal

$= \frac{25}{100} \times 1\frac{1}{2} = 0.5$kg

7. $\frac{25}{100} \times 1000 = 250$

8. $12\frac{1}{2}\%$ is $5000 = \frac{25}{2}\%100$

$= \frac{250}{200} \times 5000 = 6250$

9. What percent of:

(a) 100 is 25

$= \frac{25}{100} \times 100 = 25\%$

(b) 1 kg is 750 g $= \frac{750}{1000} = \frac{3}{4}$

So, the required % be:

$= \frac{3}{4} \times 100 = 75\%$

(c) ₹ 1000 is ₹ 250

$= \frac{250}{1000} \times 100 = 25\%$

(d) 1 liter is 350 m

1 m = 1000 ml

$= \frac{350}{1000} \times 100 = 35\%$

(e) 4 days is 16 hours

1 day = 24 hours

4 days = 96 hours

$= \frac{16}{96} \times 100 \frac{1600}{96} = 16.7\%$

(f) 48 hours is 12 hours

$= \frac{12}{48} \times 100 = \frac{1200}{48} 25\%$

Exercise 8.5

1. $\frac{50}{10} \times 100 = 500$

2. No. of students = 1600

% of girls = 35%

No. of girls $= \frac{35}{100} \times 1600 = 560$

No. of boys $= 1600 - 560 = 1040$

3. Price of decreases from ₹ 35000 to ₹ 250000

Decreases amount = ₹ 100000

% of decreases $= \frac{100000}{350000} \times 100$

$= 28.67\%$

4. Population of village 55400 to 58000

Increase amount = ₹ 2600

% of increase

$= \frac{2600}{55400} \times 100 = 4.69\%$

5. 25% increase saree ₹ 100 to ₹ 100 = 125%

On dividing both side by 5

5% = 20 Rs

100 – 20 = 80 Rs

6. Total marks = 400

Marks obtained = 352

Overall % $= \frac{352}{400} \times 100$

Overall% = 88%

7. Salary of Mr. Sharma ₹ 25000

House rent 20%

Education kids = 10%

Other expenses = 50%

House rent $= \frac{20}{100} \times 25000 =$ ₹5000

Education kids $= \frac{10}{100} \times 25000$

= ₹2500

Other expenses $= \frac{50}{100} \times 25000$

= ₹12500

8. Total candidates = 2000

Passed candidates = 75%

% of failed candidates = 25%

No. of failed students

$= \frac{25}{100} \times 2000 = 500$

9. Total income = ₹ 20000

Aditi spends = ₹16000

Aditi saves = 20000 – 16000

= ₹ 4000

% of saving $= \frac{400}{20000} \times 100 = 20\%$

10. Total marks = 400

Total marks obtained = 247

% scored by Rakesh

$= \frac{247}{400} \times 100 = 61.75\%$

11. Total marks Tanu scored = 480

% of Tanu $= \frac{480}{500} \times 100 = 96\%$

Total marks Diksha scored = 960

% of Diksha $= \frac{960}{1000} \times 100$

$= 96\%$

$\therefore$ Both obtained same marks

12. Total oranges = 5 dozen

1 dozen = 12 piece

5 dozen = 5 × 12 = 60 piece

% of obtain box = 100 – 300

= 70%

Oranges are left in box $= \frac{70}{100} \times 60$

$= 42$

13. Room rent = ₹4500

Luxury tax = 8%

Pay in all for the one days

$= \frac{8}{100} \times 4500 = 360$

Three days = 3 × 36 = ₹ 1080

14. Express the first quantity as a percentage of the second:

(a) 25, 30

$= \frac{25}{30} \times 100 \quad = \frac{250}{3}$

$= 83.3\%$

(b) ₹ 50, ₹ 550

$= \frac{50}{550} \times 100 \quad = \frac{500}{55} = 9.09\%$

(c) 2 dozen, 2 score

2 × 12 = 24 score

$= \frac{24}{2} \times 100 = 1200$

15. Total marks = 400

Total obtained = 149

Total marks $= \frac{75}{100} \times 400 = 300$

More obtained in English

= 300 – 149

= 106

Exercise-8.6

1. (a) C.P. = ₹15, S.P. = ₹20

Profit = S.P. – C.P.

$= 20 - 15 = 5$

Profit % $= \frac{\text{Profit}}{\text{C.P.}} \times 100$

$= \frac{5}{15} \times 100 = \frac{100}{3} = 33.3\%$

(b) C.P. = ₹125, S.P. = ₹140

Profit $= 140 - 125 =$ ₹15

Profit % $= \frac{15}{125} \times 100$

$= \frac{300}{25} = 12\%$

(c) C.P. = ₹20000, S.P. = ₹24000

Profit $= 24000 - 20000$

= ₹4000

Profit % $= \frac{4000}{20000} \times 100 = 20\%$

(d) C.P. = ₹15000, S.P. = ₹16000

Profit $= 16000 - 15000 =$ ₹1000

Profit % $= \frac{1000}{15000} \times 100 = 6.66\%$

2. (a) C.P. = ₹250, S.P. = ₹225

Loss = C.P. – S.P.

$= 250 - 225 =$ ₹25

Loss % $= \frac{\text{Loss}}{\text{C.P.}} \times 100$

$= \frac{25}{250} \times 100 = 10\%$

(b) C.P. = ₹1075, S.P. = ₹950

Loss = C.P. – S.P.

$= 1075 - 950 =$ ₹125

Loss % $= \frac{125}{1075} \times 100 = 11.73\%$

(c) C.P. = ₹120, S.P. = ₹110

Loss = C.P. – S.P.

$= 120 - 110 =$ ₹10

Loss % $= \frac{10}{120} \times 100$

$= \frac{100}{12} = 8.33\%$

(d) C.P. = ₹350, S.P. =₹280

Loss = C.P. – S.P.

$= 350 - 280 =$ ₹70

$\text{Loss \%} = \frac{70}{350} \times 100$

$= \frac{700}{35} = 20\%$

3. (a) S.P. = ₹220, Profit = 10%

C.P. = S.P. – Profit

$= 220 - 10 =$ ₹200

Loss % = C.P. – S.P.

= 200 – 220 = ₹– 20

(b) S.P. = ₹190, Loss = 5%

C.P. = S.P. + Loss

Loss = C.P. – S.P.

$\text{Loss \%} = \frac{\text{Loss}}{\text{C.P.}} \times 100$

$\text{Loss \%} = \frac{\text{C.P.} - \text{S.P.}}{\text{C.P.}} \times 100$

$5\ \% = \frac{100 - \text{S.P.}}{\text{C.P.}} \times 100$

$= \frac{\text{S.P.}}{\text{C.P.}} \times 100 = 100 - 5$

$= \frac{190}{\text{C.P.}} \times 100 = 95$

$\text{C.P.} = \frac{190 \times 100}{95}$ C.P. = 200

(c) S.P. = 446,

$\text{Profit \%} = 11\frac{1}{2}\% = \frac{23}{2}\%$

$\text{Profit \%} = \frac{\text{S.P.} - \text{C.P.}}{\text{C.P.}} \times 100$

$= \frac{23}{2} = \frac{\text{S.P.}}{\text{C.P.}} \times 100 - 100$

$= \frac{\text{S.P.}}{\text{C.P.}} \times 100 = 100 + 11\frac{1}{2}$

$= \frac{\text{S.P.}}{\text{C.P.}} \times 100 = 111\frac{1}{2}$

$= \frac{446 \times 100 \times 2}{177}$

= C.P. = 400

(d) S.P. = 1690

$\text{Loss \%} = \frac{\text{C.P.} - \text{S.P.}}{\text{C.P.}} \times 100$

$15\frac{1}{2}\% = 100 - \frac{\text{S.P.}}{\text{C.P.}} \times 100$

$84\frac{1}{2} = \frac{\text{S.P.}}{\text{C.P.}} \times 100$

$\text{C.P.} = \frac{\text{S.P.} \times 100}{84\frac{1}{2}}$

$\text{C.P.} = \frac{1690 \times 100}{84\frac{1}{2}}$

C.P. = 2000

4. Shopkeeper purchase = ₹225

Shopkeeper sold = ₹2500

C.P. = ₹225, S.P. = ₹2500

Profit = S.P. – C.P.

= 2500 – 225 = ₹2275

$\text{Profit \%} = \frac{2275}{225} \times 100 = \frac{9100}{9}$

$= 1011.11\%$

Loss = C.P. – S.P.

= 225 – 2500 = ₹2275

$\text{Loss \%} = \frac{-2275}{225} \times 100$

$= -1011.11\%$

5. $\text{C.P.} = \frac{24}{12} =$ ₹2

$\text{S.P.} = \frac{15}{5} =$ ₹3

Profit = S.P. – C.P.

= 3 – 2 = ₹1

$\text{Profit \%} = \frac{1}{2} \times 100 = \frac{100}{2} = 50\%$

Loss = C.P. – S.P.

= – 1

$\text{Loss \%} = \frac{-1}{2} \times 100 = -50\%$

6. Let the C.P. of article be x

Loss% = 10%, Loss = 10% of x

$= \frac{10}{100}$ of $x = \frac{x}{10}$

Acc. tp questions

S.P. = ₹9000

C.P. – Loss = 9000

$\frac{x-x}{10}=9000 \quad \frac{10x-x}{10}=9000$

$\frac{9x}{10}=9000 \quad 9x=9000$

$x=$ ₹10000

7. 4 dozen = 12 × 4 = ₹48

C.P. = ₹48

S.P. = 1.50 × 48 = 72

Profit = S.P. – C.P.

= 72 – 48 = ₹24

$\text{Profit \%} = \frac{\text{Profit}}{\text{C.P.}} \times 100$

$= \frac{24}{48} \times 100 = 50\%$

8. $S.P._1$., Profit % = 15%

$\text{Profit \%} = \frac{\text{S.P.}-\text{C.P}}{\text{C.P.}} \times 100$

$15 = \frac{230-\text{C.P.}}{\text{C.P.}} \times 100$

$15 = \frac{230}{\text{C.P.}} \times 100 - 100$

$115 = \frac{23000}{\text{C.P.}}$

$\text{C.P.} = \frac{23000}{115} \quad \text{C.P.} =$ ₹200

$S_1.S_2 = 300$

$\text{Profit \%} = \frac{\text{S.P.}-\text{C.P}}{\text{C.P.}} \times 100$

$= \frac{300-200}{200} \times 100 = \frac{100}{2} = 50\%$

9. Profit % of 1 radio = 12%

Loss of 2 radio = 17%

S.P. of two radios = ₹156

C.P. of each radio = 17 + 12%

= 156

29% = 156

$100\ \% = \frac{156 \times 100}{25} = 537.93\%$

10. C.P. of each toy = ₹500

Loss% = 10%

Profit% = 10%

10% of 500 = ₹50

For 2 toys = 10% of 1000 = ₹100

S.P. = 100 + 50 + 50 = ₹650

11. C.P. of cycles = 850 + 120 = ₹970

S.P. = 1000

Profit = S.P. – C.P.

= 1000 – 970 = ₹30

$\text{Profit\%} = \frac{30}{970} \times 100 = 3.09\%$

12. C.P. of house = 480000 + 120000

= ₹600000

S.P. = ₹750000

Profit = S.P. – C.P.

= 750000 – 600000

= ₹150000

$\text{Profit\%} = \frac{150000}{600000} \times 100 = 25\%$

Exercise - 8.7

1. **Calculate the simplest interest and amount when:**

(a) P = ₹ 600, R = 6%

T = 3

$\text{S.I} = \frac{\text{P} \times \text{R} \times \text{T}}{100} = \frac{600 \times 6 \times 3}{100}$

S.I =₹108

Amount = Principal + S.I.

= 108 + 600 = ₹ 708

(b) P = ₹ 1000, R = 5%

T = 5

$\text{S.I} = \frac{\text{P} \times \text{R} \times \text{T}}{100} = \frac{1000 \times 5 \times 5}{100}$

S.I =₹250

Amount = Principal + S.I.

= 250 + 1000 = ₹ 1250

(c) P = ₹ 4500, R = 4.5%

$\text{T} = 6 \text{ month} = \frac{6}{12} = 0.5$

$\text{S.I} = \frac{\text{P} \times \text{R} \times \text{T}}{100}$

$= \frac{4500 \times 4.5 \times 0.5}{100}$ S.I =₹101.25

Amount = Principal + S.I

= 4500 + 101.25 = ₹ 4601.25

2. Calculate the ratio of interest in the following:

(a) P = ₹ 100, S.I = 20, R = ?, T = 4

$$S.I = \frac{P \times R \times T}{100}$$

$$20 = \frac{100 \times R \times 4}{100} \quad = 20 = R \times 4$$

$$\frac{20}{4} = R \quad = 5\%$$

(b) P = ₹ 500, S.I = ₹ 300, R = ?
T = 4

$$S.I = \frac{P \times R \times T}{100}$$

$$300 = \frac{500 \times R \times 4}{100}$$

$$300 = 20R \quad = \frac{300}{20} = R \quad = 15\%$$

(c) P = ₹ 250, S.I = ₹ 70
R = ?, T = 4

$$S.I = \frac{P \times R \times T}{100}$$

$$70 = \frac{250 \times R \times 4}{100}$$

$$7 = 100R \quad = \frac{7}{100} = R \quad = 7\%$$

3. P = ₹ 1000, S.I = ?, R = 8%
T = 4 years

$$S.I = \frac{P \times R \times T}{100} = \frac{1000 \times 8 \times 4}{100}$$

=₹320

= 320 + 1000 = ₹ 1320

4. S.I = A – P
S.I = 9000 – 7500 = S.I = ₹ 1500
P = ₹ 7500, S.I = ₹ 1500, T = 2
R = ?

$$S.I = \frac{P \times R \times T}{100} =$$

$$1500 = \frac{7500 \times R \times 2}{100}$$

$$1500 = 150R$$

$$R = \frac{1500}{150} \quad R = 10\%$$

5. Ratio interest double itself = 10%
10% = 1 years
100% = 10 years

6. S.I = A – P
S.I = 885 – 750
S.I = ₹ 135

$$S.I = \frac{P \times R \times T}{100}$$

$$135 = \frac{750 \times R \times 3}{100} \quad 135 = 225R$$

$$R = \frac{1350}{225} \quad R = 6\%$$

When P ₹1800

$$S.I = \frac{1800 \times 6 \times 2.5}{100}$$

S.I = ₹ 270
Amount = S.I + P
= 270 + 1800 = ₹ 2070

7. $P_1 = 3000$
$T_1 = 4$, $P_2 = 8000$, $T_2 = 2.5$

$$S.I_1 = \frac{3000 \times 4x}{100} \quad S.I_1 = 120x$$

$$S.I_2 = \frac{8000 \times 2.5x}{100} \quad S.I_1 = 200x$$

$S.I_1 + S.I_2 = 2880$
$120x + 200x = 2880$
$320x = 2880$

$$x = \frac{2880}{320} \quad x = 9\%$$

8. Find the principal in following cases:

(a) S.I = ₹ 240, T = 2 years, R = 6%

$$P = \frac{S.I \times 100}{R \times T} = \frac{224 \times 100 \times 3}{6 \times 2}$$

$$= \frac{24000}{12} \quad P = ₹\ 2000$$

(b) S.I = ₹ 220

$T = 4 = \frac{4}{12} = 0.34$, R = 4%

$P = \frac{S.I \times 100}{R \times T} = \frac{224 \times 100 \times 3}{0.34 \times 4}$

$= \frac{67200}{4} = 16800$ P = ₹ 16800

Multiple choice question:

1. a **2.** c **3.** a **4.** c **5.** b

NCERT CORNER

Fill in the blanks:

1. Less **2.** Principal

3. Simple interest

4. Project **5.** Loss

True and False:

1. False **2.** False **3.** False **4.** False

5. True

Chapter-9

Chapter - 9.1

1. Write down the following as a rational numbers:

(a) $\frac{7}{1}$ (b) $\frac{-6}{1}$ (c) $\frac{0}{1}$ (d) $\frac{-5}{1}$ (e) $\frac{26}{1}$

2. Identify the numerator and denominator each of the following rational numbers:

(a) $\frac{17}{25}$

Numerator = 17

Denominator = 25

(b) $\frac{-11}{23}$

Numerator = – 11

Denominator = 23

(c) $\frac{16}{-29}$

Numerator = 16

Denominator = – 29

(d) $\frac{-13}{-24}$

Numerator = – 13

Denominator = – 24

(e) $\frac{+11}{-23}$

Numerator = 11

Denominator = – 23

3. Write down the following rational number as an integer:

(a) 11 (b) 13 (c) – 16 (d) 0 (e) 18

4. Identify positive and negative rational numbers:

(a) Positive (b) Negative

(c) Negative (d) Positive

(e) Positive

5. Write the rational numbers whose numerator and denomina -tor are given below:

(a) $\frac{-4 \times 5}{-7 + (12)} = \frac{-20}{-19}$

(b) $\frac{8 - 5}{(-2) \times (-3)} = \frac{3}{6}$

Exercise - 9.2

1. Express each of the following as a rational numbers with positive denominator:

(a) $\frac{-4}{5}$ (b) $\frac{-7}{9}$ (c) $\frac{-11}{15}$ (d) $\frac{-24}{17}$

(e) $\frac{-21}{29}$

2. Determine whether the following rational numbers are in the lowest form or not:

(a) Yes (b) No (c) No

(d) Yes (e) No

3. Express each of the following rational in the lowest from:

(a) $\frac{-144}{235}$ (b) $\frac{-786}{282} = \frac{-389}{141}$

(c) $\frac{-525}{415} = \frac{105}{85}$

(d) $\frac{216}{-432} = \frac{-1}{2}$ (e) $\frac{-648}{+576} = \frac{8}{7}$

4. Determine whether the

following rational numbers are in the standard form or not:

(a) No (b) Yes (c) Yes
(d) Yes (e) No

5. Express each of the following rational in the standard from:

(a) $\frac{12}{60} = \frac{1}{5}$ (b) $\frac{15}{45} = \frac{-1}{3}$

(c) $\frac{288}{-144} = \frac{-2}{1}$ (d) $\frac{216}{408} = \frac{108}{107}$

(e) $\frac{624}{-112} = \frac{11}{4}$

6. Express $\frac{7}{5}$ as a rational number with numerator:

(a) $\frac{7}{5} = \frac{7}{5} \times \frac{7}{7} = \frac{49}{30}$

(b) $\frac{7}{5} = \frac{7}{5} \times \frac{11}{11} = \frac{77}{55}$

(c) $\frac{7}{5} = \frac{7}{5} \times \frac{12}{12} = \frac{84}{60}$

(d) $\frac{7}{5} = \frac{7}{5} \times \frac{14}{14} = \frac{-98}{70}$

(e) $\frac{7}{5} = \frac{7}{5} \times \frac{8}{8} = \frac{-56}{40}$

7. Express $\frac{2}{3}$ as a rational number with denominator:

(a) $\frac{2}{3} = \frac{2}{3} \times \frac{10}{10} = \frac{20}{30}$

(b) $\frac{2}{3} = \frac{2}{3} \times \frac{16}{16} = \frac{32}{-48}$

(c) $\frac{2}{3} = \frac{2}{3} \times \frac{32}{32} = \frac{64}{-96}$

(d) $\frac{2}{3} = \frac{2}{3} \times \frac{10}{10} = \frac{20}{30}$

(e) $\frac{2}{3} = \frac{2}{3} \times \frac{12}{12} = \frac{24}{-36}$

8. Fill in the blanks:

(a) –56, –45 (b) 143, –55
(c) –12, –14 (d) –245, 189

Chapter - 9.3

1. Whether of the following rational numbers are equal:

(a) $\frac{-11}{15}, \frac{-15}{11}$ $\frac{-11}{15} \times \frac{-15}{11}$

$-11 \times 11 = -15 \times 15$

$-121 \neq -225$

They are not equal

(b) $\frac{-3}{8}, \frac{2}{9}$ $\frac{-3}{8} \times \frac{2}{9}$

$-3 \times 9 = 2 \times 8$ $-27 \neq 16$

They are not equal

(c) $\frac{-1}{3}, \frac{-4}{12}$ $\frac{-1}{3} \times \frac{-4}{12}$

$-1 \times 12 = 4 \times 3$ $-12 = -12$

They both are equal

(d) $\frac{5}{-20}, \frac{-1}{4}$

$5 \times 4 = 1 \times (-20)$ $20 = 20$

They both are equal

2. Compare the following rational numbers:

(a) $\frac{-11}{25}, \frac{-19}{15}$

$-11 \times 15 = -19 \times 25$

$-165 = -4975$ $= \frac{-11}{25} > \frac{-19}{25}$

(b) $\frac{16}{18}, \frac{-25}{18}$ $= 16 \times 18 = -25 \times 18$

$288 = -450 = \frac{16}{18} > \frac{-25}{18}$

(c) $\frac{-11}{21}, \frac{16}{21}$

$-11 \times 21 = 16 \times 21$

$-321 = 336$ $\frac{-11}{21} < \frac{16}{21}$

(d) $\frac{10}{19} < \frac{12}{19}$

(e) $\frac{-4}{11}, \frac{4}{7}$ $-4 \times 7 = 4 \times 11$

$-28 = 44$ $\frac{-4}{11} < \frac{4}{7}$

(f) $\frac{-11}{15}, \frac{11}{-18}$

$-11\times(-18)=11\times15$

$198=165 \quad \frac{-11}{15}>\frac{11}{-18}$

(g) $\frac{21}{17}, \frac{21}{15}$

$21\times15=21\times17$

$315=357 \quad \frac{21}{17}<\frac{21}{15}$

(h) $\frac{16}{9}, \frac{16}{21}$

$16\times21=16\times9$

$336=144 \quad \frac{16}{9}>\frac{16}{21}$

(i) $\frac{-16}{21}, \frac{-5}{7} \quad =-16\times7=-5\times21$

$=-112=-105 \quad =\frac{-16}{21}<\frac{-5}{7}$

(j) $\frac{-3}{8}, \frac{-2}{9} \quad =-3\times9=-2\times8$

$=-27=-16 \quad =\frac{-3}{8}<\frac{-2}{9}$

(k) $\frac{-11}{10}, \frac{-3}{2} \quad =-11\times2=-3\times10$

$=-22=-30 \quad =\frac{-11}{10}>\frac{-3}{2}$

(l) $\frac{17}{4}, \frac{33}{12} \quad =17\times12=33\times4$

$=204=132 \quad =\frac{17}{4}>\frac{33}{12}$

(m) $-6\frac{1}{4}, 5\frac{2}{1} \quad \frac{-25}{4}, \frac{7}{1}$

$-25\times1=7\times4$

$-25=28 \quad -6\frac{1}{4}<5\frac{2}{1}$

(n) $3\frac{1}{2}, -3\frac{2}{3} \quad \frac{7}{2}, \frac{-11}{3}$

$7\times3=-11\times2$

$21=-22 \quad 3\frac{1}{4}>-3\frac{2}{3}$

(o) $2\frac{1}{4}, 3\frac{1}{2} \quad \frac{9}{4}, \frac{7}{2}$

$9\times2=7\times4$

$18=28 \quad 2\frac{1}{4}<3\frac{1}{2}$

(p) $6\frac{2}{3}, 5\frac{1}{9} \quad \frac{20}{3}, \frac{46}{9}$

$20\times9=46\times3$

$180=138 \quad 6\frac{2}{3}>5\frac{1}{9}$

3. Arrange the following rational numbers in increasing order:

(a) $\frac{18}{-11}<\frac{-16}{11}<\frac{-5}{11}<\frac{2}{-11}<\frac{4}{11}$

(b) $\frac{-2}{15}, \frac{-2}{9}, \frac{2}{-3}, \frac{2}{-11}, \frac{2}{17}$

L.C.M of 15, 9 –3, 11, 17 is 8415

$\frac{-2}{15}<\frac{-2}{-11}<\frac{-2}{9}<\frac{2}{-3}<\frac{2}{17}$

(c) $\frac{-2}{3}, \frac{-5}{6}, \frac{7}{12}, \frac{-1}{4}, \frac{5}{24}$

L.C.M of 3, 6, 12, 4, 24 is 72

$\frac{-2}{3}\times\frac{24}{24}=\frac{-48}{72}$

$\frac{-5}{6}\times\frac{12}{12}=\frac{-60}{72}$

$\frac{7}{12}\times\frac{6}{6}=\frac{42}{72}$

$\frac{-1}{4}\times\frac{18}{18}=\frac{-18}{72}$

$\frac{5}{24}\times\frac{3}{3}=\frac{15}{72}$

$\therefore \frac{-5}{6}<\frac{-2}{3}<\frac{-1}{4}<\frac{5}{24}<\frac{4}{12}$

(d) $\frac{-4}{6}, \frac{2}{4}, \frac{-5}{4}, \frac{3}{2}, \frac{-9}{4}$

L.C.M of 16, 4, 4, 2, 4 is 16

$\frac{-4}{16}\times\frac{1}{1}=\frac{-4}{16} \quad \frac{2}{4}\times\frac{4}{4}=\frac{8}{16}$

$\frac{-5}{4}\times\frac{4}{4}=\frac{-20}{16} \quad \frac{-3}{2}\times\frac{8}{8}=\frac{24}{16}$

$\frac{-9}{4} \times \frac{4}{4} = \frac{-36}{4}$

$\therefore \frac{-9}{4} < \frac{-5}{4} < \frac{-4}{16} < \frac{2}{4} < \frac{3}{2}$

4. Arrange the following numbers in decreasing order:

(a) $\frac{18}{11} > \frac{4}{11} > \frac{-2}{11} > \frac{-5}{11} > \frac{-11}{11}$

(b) $\frac{-4}{14}, \frac{-4}{11}, \frac{-4}{9}, \frac{-4}{5}, \frac{-4}{2}$

(c) $\frac{-2}{7}, \frac{9}{14}, \frac{-11}{35}, \frac{-14}{70}, \frac{13}{14}$

L.C.M of 7, 14, 35, 70, 14 is 490

$\frac{-2}{7} \times \frac{70}{70} = \frac{-140}{490}$

$\frac{9}{14} \times \frac{35}{35} = \frac{315}{490}$

$\frac{-11}{35} \times \frac{14}{14} = \frac{-154}{490}$

$\frac{-14}{70} \times \frac{7}{7} = \frac{-98}{490}$

$\frac{13}{14} \times \frac{35}{35} = \frac{455}{490}$

$\therefore \frac{13}{14} > \frac{9}{14} > \frac{-14}{70} > \frac{-21}{35} > \frac{-2}{7}$

(d) $\frac{2}{12}, \frac{-6}{24}, \frac{-5}{48}, \frac{-1}{24}, \frac{3}{24}$

L.C.M of 12, 24, 48, 24, 24 is 144

$\frac{2}{12} \times \frac{12}{12} = \frac{24}{144}$ $\quad \frac{-6}{24} \times \frac{6}{6} = \frac{-36}{144}$

$\frac{-5}{48} \times \frac{3}{3} = \frac{-15}{144}$ $\quad \frac{-1}{24} \times \frac{6}{6} = \frac{-6}{144}$

$\frac{3}{24} \times \frac{6}{6} = \frac{18}{144}$

$\therefore \frac{2}{12} > \frac{3}{24} > \frac{-1}{24} > \frac{-5}{48} > \frac{-6}{24}$

Exercise - 9.4

1. Draw a number line and represent the following rational numbers on it:

Do yourself.

2. $\frac{-1}{2}$ and $\frac{1}{5}$

L.C.M of 2 and 5 = 10

$\frac{-1}{2} \times \frac{5}{5} = \frac{-5}{10}$ $\quad \frac{1}{5} \times \frac{2}{2} = \frac{2}{10}$

$= \frac{-4}{10}$

3. $\frac{3}{20}, \frac{3}{10}, \frac{4}{5}$

4. $\frac{4}{13}$ and $\frac{13}{39}$

L.C.M of 13 and 39 = 39

$\frac{4}{13} \times \frac{3}{3} = \frac{12}{39} \times \frac{5}{5} = \frac{60}{195}$

$\frac{13}{39} \times \frac{1}{1} = \frac{13}{39} \times \frac{5}{5} = \frac{65}{195}$

$\frac{61}{195}, \frac{62}{195}, \frac{63}{195}, \frac{64}{195}$

5. Identify the positive and negative rational numbers. Write in separate column:

Negative	Positive
$\frac{-5}{8}$	$\frac{3}{2}$
$\frac{-4}{5}$	$\frac{-6}{-7}$
$\frac{17}{-34}$	$\frac{8}{3}$
$\frac{-16}{17}$	$\frac{17}{38}$
$\frac{-13}{18}$	$\frac{9}{16}$
$\frac{-15}{19}$	$\frac{-16}{-17}$
$\frac{13}{-19}$	

$\frac{-5}{13}$	

Chapter - 9.5

1. Add the following rational numbers:

(a) $\frac{-2}{7}$ and $\frac{5}{7}$

$\frac{-2}{7}+\frac{5}{7}=\frac{-2+5}{7}=\frac{3}{7}$

(b) $\frac{-7}{12}$ and $\frac{-5}{12}$

$\frac{-7+(-5)}{12}=\frac{-7-5}{12}=\frac{12}{12}=-1$

(c) $\frac{5}{8}$ and $\frac{3}{8}$ $\quad \frac{5+3}{8}=\frac{8}{8}=1$

(d) $\frac{9}{11}$ and $\frac{5}{-11}$ $\quad \frac{9+(-5)}{11}=\frac{4}{11}$

(e) $\frac{2}{3},\frac{7}{3},\frac{-5}{3}$

$\frac{2+7+(-5)}{3}=\frac{9+(-5)}{3}=\frac{4}{3}$

(f) $\frac{-4}{9},\frac{-5}{9}$ and $\frac{-7}{9}$

$\frac{-4+(-5)+(-7)}{9}$

$=\frac{-4-5-7}{9}=\frac{-16}{9}$

2. Add the following rational numbers:

(a) $\frac{1}{2}$ and $\frac{3}{4}$

L.C.M of 2 and 4 is 4

$\frac{2+3}{4}=\frac{5}{4}$

(b) $\frac{-7}{1}$ and $\frac{5}{7}$

L.C.M of 1 and 7 is 7

$\frac{-7+5}{7}=\frac{-2}{7}$

(c) $\frac{5}{12}$ and $\frac{3}{8}$

L.C.M of 12 and 8 is 24

$\frac{10+9}{24}=\frac{19}{24}$

(d) $\frac{7}{18}$ and $\left(\frac{-5}{12}\right)$

L.C.M of 12 and 15 is 36

$\frac{14+(-15)}{36}=\frac{-1}{36}$

(e) $\left(\frac{-17}{20}\right)$ and $\frac{13}{15}$

L.C.M of 20 and 15 is 60

$\frac{-51+52}{60}=\frac{1}{60}$

(f) $\left(\frac{-3}{17}\right)$, and $\frac{-8}{51}$

L.C.M of 17 and 51 is 51

$\frac{-9+(-102)+(-8)}{51}$

$=\frac{-9-102-8}{51}=\frac{-119}{51}$

3. Simplify:

(a) $\frac{2}{5}+\frac{4}{15}$

L.C.M of 5 and 15 is 15

$\frac{6+4}{15}=\frac{10}{15}=\frac{2}{3}$

(b) $\frac{-1}{9}+\frac{1}{8}$

L.C.M of 9 and 8 is 72

$\frac{-8+9}{72}=\frac{1}{27}$

(c) $\frac{2}{15}+\left(\frac{-7}{30}\right)$

L.C.M of 15 and 30 is 30

$\frac{6+(-7)}{30}=\frac{-3}{30}=\frac{-1}{10}$

(d) $\frac{3}{4}+\left(\frac{-2}{6}\right)+\frac{-5}{16}$

L.C.M of 4, 6 and 16 is 48

$\frac{-36+(16)+(-15)}{48}$

$$= \frac{36-16-15}{48} = \frac{5}{48}$$

(e) $\left(\frac{-16}{15}\right) + \frac{70}{30} + \frac{-1}{45}$

L.C.M of 15, 30 and 45 is 90

$$\frac{-36+210+(-2)}{90}$$

$$= \frac{-36+210-2}{90} = \frac{172}{90}$$

(f) $\frac{9}{10} + \left(\frac{-3}{5}\right) + \left(\frac{-7}{15}\right)$

L.C.M of 10, 5 and 15 is 30

$$= \frac{27+(-18)+(-14)}{30}$$

$$= \frac{27-18-14}{30} = \frac{-5}{30} = \frac{-1}{6}$$

4. Let the other no. be x:

$$x + \left(\frac{-15}{18}\right) = \frac{-5}{9}$$

$$x = \frac{-5}{9} - \left(\frac{-5}{18}\right) = \frac{-10-(-5)}{18}$$

$$x = \frac{-5}{18}$$

5. $\frac{-17}{36} - \frac{5}{18}$

$$= \frac{-17-10}{36} = \frac{-27}{36} = \frac{-3}{4}$$

6. Let the no. be *x*:

$$\frac{-3}{4} + \frac{1}{2} + x = \frac{7}{24}$$

$$\frac{-3+2}{4} + x = \frac{7}{24}$$

$$\frac{-1}{4} + x = \frac{7}{24} \qquad = x = \frac{7}{24} + \frac{1}{4}$$

$$x = \frac{7+6}{24} \qquad x = \frac{13}{24}$$

7. $\frac{4}{10} + \left(\frac{-13}{15}\right) + \left(\frac{-9}{50}\right)$

L.C.M of 10, 15 and 50 is 150

$$\frac{60+(-130)+(-27)}{150}$$

$$= \frac{60-130-27}{150} = \frac{-97}{150}$$

8. $\frac{3}{8} + \frac{7}{12} + \left(\frac{-2}{9}\right)$

L.C.M of 8, 12 and 9 is 72

$$\frac{27+42+(-16)}{72} = \frac{27+42-16}{72}$$

$$= \frac{53}{72}$$

9. $4\frac{1}{2} + 6\frac{2}{3} \qquad \frac{9}{2} + \frac{20}{3}$

$$\frac{27+40}{6} = \frac{67}{6}$$

10. $4\frac{2}{5} + \left(\frac{-31}{10}\right) + \left(\frac{-7}{15}\right) + \left(-6\frac{7}{30}\right)$

$$\frac{22}{5} + \left(\frac{-31}{10}\right) + \left(\frac{-7}{15}\right) + \left(\frac{-187}{30}\right)$$

$$= \frac{132+(-93)+(-14)+(-187)}{30}$$

$$= \frac{132-93-14-187}{30}$$

$$= \frac{-162}{30} = \frac{-27}{5}$$

Chapter - 9.6

1. Subtract the first rational numbers from the second in each of the following:

(a) $\frac{5}{9}, \frac{7}{9} \quad = \frac{7-5}{9} = \frac{2}{9}$

(b) $\frac{-6}{11}, \frac{8}{11} \quad = \frac{8-(-6)}{11} = \frac{14}{11}$

(c) $\frac{4}{13}, \frac{-7}{13} \quad = \frac{-7-4}{13} = \frac{-11}{13}$

(d) $\frac{-7}{15}, \frac{-9}{15}$

$$= \frac{-9-(-7)}{15} = \frac{-9+7}{15} = \frac{-2}{15}$$

2. Solve the following:

(a) $\frac{7}{8}-\frac{-2}{16}$

L.C.M of 8 and 16 is 16

$\frac{14-(-2)}{16}=\frac{16}{16}=1$

(b) $\left(\frac{-9}{14}\right)-\left(\frac{4}{-5}\right)$

L.C.M of 14 and 5 is 70

$\frac{-45-(-56)}{70}=\frac{-45+56}{70}=\frac{11}{70}$

(c) $\left(\frac{-2}{15}\right)-\left(\frac{-5}{10}\right)$

L.C.M of 15 and 10 is 30

$\frac{-4-(-15)}{30}=\frac{-4+15}{30}=\frac{11}{30}$

(d) $-5-\left(\frac{-4}{9}\right)$

L.C.M of 1 and 9 is 9

$\frac{-45-(-4)}{9}=\frac{-45+9}{9}=\frac{36}{9}=-4$

3. Let the other no, be x

$x+\frac{1}{3}=\frac{4}{9}$ $\quad x=\frac{4}{9}-\frac{1}{3}$

$x=\frac{4-3}{9}=\frac{1}{9}$ $\quad x=\frac{1}{9}$

4. Let the other no, be x

$x+\left(\frac{-5}{3}\right)=\frac{-2}{3}$ $\quad x=\frac{-2}{3}-\left(\frac{-5}{3}\right)$

$x=\frac{-2-(-5)}{3}=\frac{-2+5}{3}$

$x=\frac{3}{3}=1$

5. Let the no. be x

$\frac{-5}{10}+x=2$ $\quad x=\frac{2+5}{10}$

$x=\frac{20+5}{10}=\frac{25}{10}$ $\quad x=\frac{5}{2}$

6. Let the third no. be x

$\frac{-2}{3}=\frac{5}{9}+x=\frac{19}{18}$

$\frac{-6+4}{9}+x\frac{19}{18}$

$\frac{-1}{9}+x=\frac{19}{18}$ $\quad x=\frac{19}{18}=\frac{1}{9}$

$x=\frac{19+2}{18}$ $\quad x=\frac{7}{6}$

7. Let the no, be x

$\left(\frac{1}{3}+\frac{1}{4}\right)+x=5$

$\left(\frac{4+3}{12}\right)+x=5\frac{7}{12}+x=5$

$x=\frac{5-7}{12}$

$x=\frac{60-7}{12}$ $\quad x=\frac{53}{12}$

8. Let the no, be x

$\frac{2}{15}-x=\frac{3}{7}$ $\quad -x=\frac{3}{7}-\frac{2}{15}$

$-x=\frac{45-14}{105}$ $\quad -x=\frac{31}{105}$

$x=\frac{-31}{105}$

9. Let the no, be x

Sum of $\frac{1}{2}$ and $\frac{2}{5}$

$\frac{1}{2}+\frac{1}{5}=\frac{5+2}{10}=\frac{7}{10}$

Sum of $\frac{3}{4}$ and $\frac{2}{3}$

$\frac{3}{4}+\frac{2}{3}=\frac{9+8}{12}=\frac{17}{12}$

Subtract $\frac{17}{12}$ from $\frac{7}{10}=\frac{17}{12}-\frac{7}{10}$

$=\frac{85-42}{60}=\frac{43}{60}$

10. Simplify following:

(a) $\frac{-7}{9}+\frac{5}{18}+\frac{4}{27}$

L.C.M of 9, 18, 27 is 54

$=\frac{-42+15+8}{54}=\frac{9}{54}$

(b) $\frac{5}{3}-\frac{2}{3}+\frac{-7}{6}$

L.C.M of 3, 3, 6, is 6

$\frac{10-4+(-7)}{6}=\frac{10-4-7}{6}=\frac{-1}{6}$

(c) $\frac{-2}{5}+\frac{3}{10}-\frac{-4}{7}$

L.C.M of 5, 10, 7 is 70

$=\frac{-28+21-(-40)}{70}$

$=\frac{-28+21+40}{70}=\frac{33}{70}$

Exercise - 9.7

1. Multiply:

(a) $\frac{3}{4}\times\frac{5}{6}$ $\quad \frac{1}{4}\times\frac{5}{2}=\frac{5}{8}$

(b) $\frac{-7}{12}\times 5$ $\quad \frac{35}{12}$

(c) $\frac{-4}{9}\times\frac{6}{7}$ $\quad \frac{-8}{21}$

(d) $\frac{6}{7}\times\frac{7}{6}$ $\quad = 1$

2. Multiply:

(a) $\frac{3}{5}\times\left(\frac{-15}{-18}\right)$ $\quad \frac{3}{5}\times\frac{-15}{-18}=\frac{1}{2}$

(b) $\frac{9}{8}\times\frac{9}{6}$

$\frac{9}{8}\times\frac{9}{6}$ $\quad =\frac{27}{16}$

(c) $\left(\frac{-2}{9}\right)\times\left(\frac{-18}{-4}\right)$

$\frac{-2}{9}\times\frac{18}{4}=-1$

(d) $\left(\frac{-6}{11}\right)\times\left(\frac{88}{-24}\right)$ $\quad \frac{-6}{11}\times\frac{88}{24}=2$

3. Simplify:

(a) $\left(\frac{-8}{18}\times\frac{27}{65}\right)+\left(\frac{2}{11}\times\frac{-22}{18}\right)$

$\frac{-3}{26}+\frac{-2}{9}=\frac{-79}{234}$

(b) $\left(\frac{-18}{22}\times\frac{-11}{-16}\right)-\left(\frac{15}{4}\times\frac{-8}{27}\right)$

$\left(\frac{-18}{22}\times\frac{-11}{-16}\right)-\left(\frac{15}{4}\times\frac{-8}{27}\right)$

$\left(\frac{-9}{16}\right)-\left(\frac{-10}{9}\right)$

$=\frac{-81-(-160)}{144}=\frac{-81+160}{144}$

$=\frac{79}{144}$

(c) $\left(\frac{13}{11}\times\frac{-22}{-26}\right)-\left(-10\times\frac{6}{50}\right)$

$\left(\frac{13}{11}\times\frac{-22}{-26}\right)-\left(-10\times\frac{6}{50}\right)$

$-1-\left(\frac{-6}{5}\right)$ $\quad \frac{-1+6}{5}$

$\frac{-5+6}{5}=\frac{1}{5}$

(d) $\left(\frac{11}{3}\times\frac{6^2}{-3}\right)-\left(\frac{26}{19}\times\frac{-57}{52}\right)$

$\frac{22}{3}-\frac{-3}{2}$

$\frac{-44-(-9)}{6}=\frac{44+9}{6}=\frac{53}{6}$

4. Multiply:

(a) $\frac{3}{8}\times\frac{-12}{21}\times\frac{-7}{4}$

$\frac{3}{8}\times\frac{-12}{21}\times\frac{-7}{4}$ $\quad =\frac{-3}{8}$

(b) $\left(\frac{-24}{19}\right)\times\left(\frac{-38}{24}\right)\times\left(\frac{-1}{4}\right)$

$\frac{-24}{19}\times\frac{-38}{24}\times\frac{1}{4}$ $\quad =\frac{-1}{2}$

5. Simplify:

(a) $\left(\frac{14}{9}\times\frac{18}{7}\right)+\left(\frac{-8}{26}\times\frac{13}{-16}\right)$

$+\left(\frac{5}{48}\times\frac{24}{25}\right)$

$$\left(\frac{14}{9}\times\frac{18}{7}\right)+\left(\frac{-8}{26}\times\frac{13}{-16}\right)$$
$$+\left(\frac{5}{48}\times\frac{24}{25}\right)$$
$$4+\frac{1}{4}+\frac{1}{10}=\frac{80+5+2}{20}$$
$$=\frac{87}{20}$$

(b) $\left(\frac{3}{10}\times\frac{15}{12}\times\frac{4}{3}\right)-\left(\frac{2}{3}\times\frac{6}{4}\times\frac{12}{18}\right)$
$$+\left(\frac{3}{17}\times\frac{34}{6}\times\frac{11}{22}\right)$$
$$\left(\frac{3}{10}\times\frac{15}{12}\times\frac{4}{3}\right)-\left(\frac{2}{3}\times\frac{6}{4}\times\frac{12}{18}\right)$$
$$+\left(\frac{3}{17}\times\frac{34}{6}\times\frac{11}{22}\right)$$
$$\frac{1}{2}-\frac{2}{3}+\frac{1}{2}$$
$$\frac{3-4+3}{36}=\frac{2}{6}=\frac{1}{2}$$

6. Total students = 60

Students like maths = $\frac{1}{5}$

Students like Science = $\frac{1}{6}$

Students like English = $\frac{1}{10}$

Students like G.K =
$$60-\left(\frac{1}{5}+\frac{1}{6}+\frac{1}{10}\right)$$
$$=60-\frac{6+5+3}{30}$$
$$=60-\frac{14}{30}=\frac{1800-14}{30}$$
$$=\frac{1786}{30}\ \frac{893}{15}$$

7. Find:

(a) (i) $\frac{2}{3}\times 60=40$ (ii) $\frac{2}{3}\times 30=20$

(iii) $\frac{2}{3}\times 45=30$ (iv) $\frac{2}{3}\times 37=18$

(b) (i) $\frac{5}{8}\times 24=15$ (ii) $\frac{5}{8}\times 46=25$

(iii) $\frac{5}{8}\times 64=80$ (iv) $\frac{5}{8}\times 80=50$

Exercise - 9.8

1. Divide:

(a) 2by $\frac{1}{4}$
$$=2\div\frac{1}{4}=\times\frac{4}{1}=\frac{1}{8}=8$$

(b) $-8$by $\frac{-5}{8}$ $=-8\div\frac{8}{-5}$
$$=\frac{-64}{-5}=\frac{64}{5}$$

(c) $\frac{3}{4}$ by $\frac{-18}{4}$ $=\frac{3}{4}\times\frac{4}{18}=\frac{1}{6}$

(d) 6by $\frac{12}{19}$
$$2\times\frac{19}{12}=\frac{19}{2}$$

(e) $\frac{2}{3}$ by $\frac{11}{2}$ $\frac{2}{3}\times\frac{2}{11}=\frac{4}{33}$

(f) $\frac{21}{36}$ by $\frac{-30}{42}$ $\frac{21}{36}\times\frac{42}{30}=\frac{49}{60}$

(g) -1 by -69
$$-1\times\frac{-1}{69}=\frac{1}{69}$$

(h) $\frac{-15}{12}$ by $\frac{10}{18}$
$$\frac{-15}{12}\times\frac{18}{10}=\frac{-45}{20}$$

2. Let the other no. be

$x\times(-10)=18$

$-10x=18$

$x=\frac{-18}{10}$ $x=\frac{-9}{5}$

3. Let the other no. be

$x \times \frac{25}{27} = \frac{-5}{9}$ $\quad x = \frac{-5}{9} \div \frac{25}{27}$

$x = \frac{-5}{9} \times \frac{27}{25}$ $\quad x = \frac{-3}{5}$

4. Let the no. be

$x \times \left(\frac{-2}{5}\right) = \frac{-18}{15}$

$x = \frac{-18}{15} \times \frac{5}{2}$ $\quad x = 3$

5. Cost of $\frac{5}{2}$ meter cloth = 125

Cost of 1 meter cloth $= 125 \div \frac{5}{2}$

$= 125 \times \frac{2}{5}$

Cost of 1 meter cloth =₹50

6. Simplify the following:

(a) $\left(\frac{2}{3} + \frac{4}{5}\right) \div \left(\frac{16}{12} - \frac{5}{4}\right)$

$\left(\frac{10+12}{15}\right) \div \left(\frac{16-15}{12}\right)$

$\frac{22}{15} \div \frac{1}{12} \quad = \frac{22}{15} \times \frac{12}{1} = \frac{88}{5}$

(b) $\left(\frac{65}{12} + \frac{8}{3}\right) \div \left(\frac{65}{12} - \frac{8}{3}\right)$

$\left(\frac{65+32}{12}\right) \div \left(\frac{65-32}{12}\right)$

$\frac{97}{12} \div \frac{33}{12} \quad = \frac{97}{12} \times \frac{12}{33} = \frac{97}{33}$

(c) $\left(\frac{-14}{9} \times \frac{27}{28}\right) \div \left(\frac{5}{21} \times \frac{42}{10}\right)$

$\left(\frac{-14}{9} \times \frac{27}{28}\right) \div \left(\frac{5}{21} \times \frac{42}{10}\right)$

$= -\frac{3}{2} \div 1 \quad = \frac{-3}{2} \times 1 = \frac{-3}{2}$

(d) $\left(\frac{2}{3} \div 1\frac{1}{4}\right) \times \left(\frac{6}{11} \times \frac{22}{12}\right)$

$\left(\frac{2}{3} \div \frac{5}{4}\right) \times \left(\frac{6}{11} \times \frac{22}{12}\right)$

$\left(\frac{2}{3} \times \frac{4}{5}\right) \times 1 = \frac{8}{15}$

7. Show x ÷ y ≠ y ÷ x if

(a) $x = \frac{2}{3}, y = \frac{5}{6}$

$\frac{2}{3} \div \frac{5}{6} = \frac{5}{6} \div \frac{2}{3}$

$\frac{2}{3} \times \frac{6}{5} = \frac{5}{6} \times \frac{3}{2} \qquad \frac{4}{5} \neq \frac{5}{4}$

(b) $x = \frac{4}{5}, y = \frac{-2}{3}$

$\frac{4}{5} \div \frac{-2}{3} = \frac{-2}{3} \div \frac{4}{5}$

$\frac{4}{5} \times \frac{-3}{2} = \frac{-2}{3} \times \frac{5}{24} \qquad \frac{-6}{5} \neq \frac{5}{6}$

(c) $x = \frac{1}{2}, y = \frac{3}{8}$

$\frac{1}{2} \div \frac{3}{8} = \frac{3}{8} \div \frac{1}{2}$

$\frac{1}{2} \times \frac{8}{3} = \frac{3}{8} \times \frac{2}{1} \qquad \frac{4}{3} \neq \frac{3}{4}$

Multiple choice Question

1. a **2.** c **3.** c **4.** c **5.** c

NCERT CORNER

Fill in the blanks:

1. 0 **2.** 1 **3.** Multiplicative inverse **4.** Positive **5.** $\frac{6}{5}$

True and False:

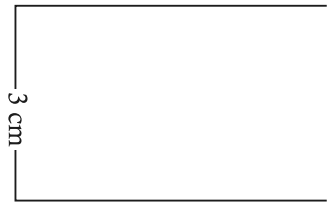
1. (a) True (b) False (c) True (d) False **2.** False **3.** False

Chapter-10

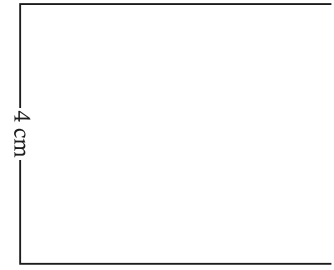
Exercise - 10.1

1. Draw a line parallel to a given line mat a distance:

(a) 3 cm



(b) 4 cm



(c) 2 cm

(d) 3.7 cm

2. Can we draw the triangle be using measure of sides given below:

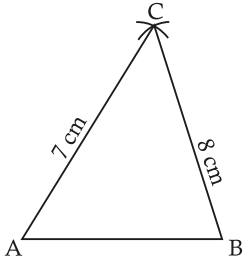
(a) Yes (b) No (c) Yes (d) No

3. Can we draw the triangle be using measure of angle given below:

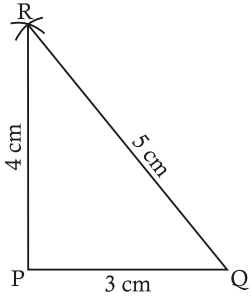
(a) 40°+70°+70° = 180° Yes
(b) 90°+40°+60° = 190° No
(c) 110°+60°+20° = 190° No
(a) 60°+60°+60° = 180° Yes

4. Construct the following triangle:

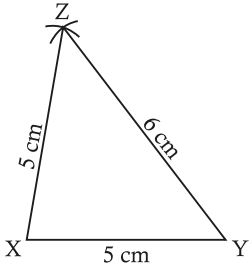
(a)



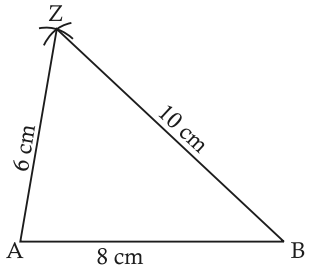
(b)



(c)

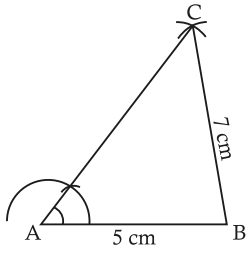


(d)

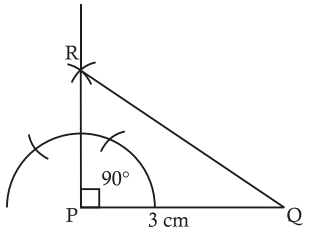


5. Construct the following triangle:

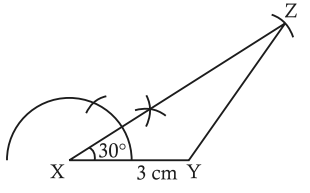
(a)



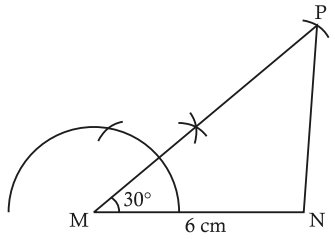
(b)



(c)

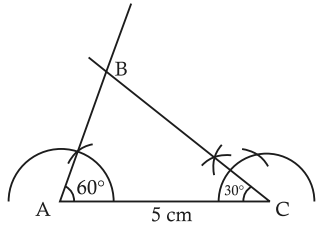


(d)

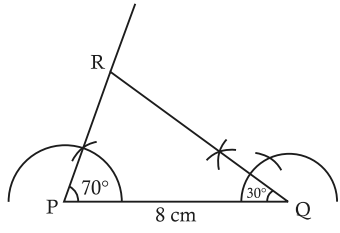


6. Construct the following triangle:

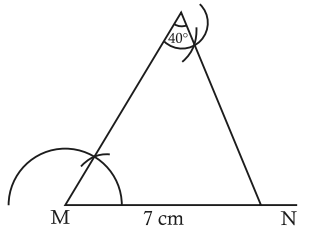
(a)



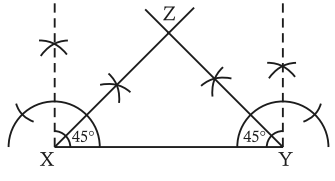
(b)



(c)

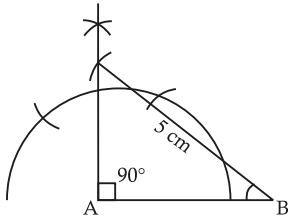


(d)

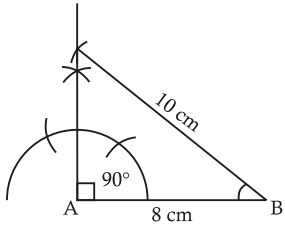


7. Construct the following right triangle:

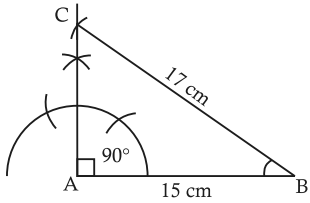
(a)



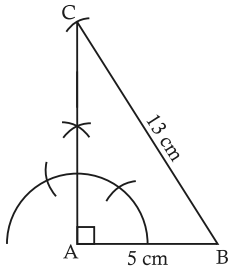
(b)



(c)



(d)



Multiple choice Question:

1. d **2.** c **3.** d **4.** a

NCERT CORNER

Fill in the blanks:

1. Constant **2.** 60° **3.** Acute

4. Not possible

True and False

1. True **2.** True **3.** True **4.** True

Chapter-11

Exercise - 11.1

1. Find the perimeter of rectangle ABCD having dimensions:

(a) Length = 15.5 m breadth = 10.5

Perimeter of rectangle = 2 $(l+b)$

= 2 (15.5+10.5)

= 2 × 26 = 52 m

(b) Length = 14 m breadth = 9.8

Perimeter of rectangle = 2 $(l+b)$

= 2 (14+9.8)

= 2 × 23.8 = 47.6 m

(c) Length = $5\frac{3}{4}$ m breadth = $2\frac{1}{2}$

Length = 5.75 Breadth = 2.5

Perimeter of rectangle = 2 $(l+b)$

= 2 (5.75+2.5)

= 2 (8.25) = 16.5 m

(d) Length = 11.5 m breadth = 7.5

Perimeter of rectangle = 2 $(l+b)$

= 2 (11.5+7.5)

= 2 × 19 = 38 m

2. Find the perimeter of square having side lengths:

(a) 20 m

Perimeter of square = 4 × side

= 4 × 20 = 80

(b) 19.8 m

Perimeter of square = 4 × side

= 4 × 19.8 = 79.2 m

(c) $12\frac{1}{2}$ m $= \frac{25}{2}$ m $= 12.5$

Perimeter of square = 4 × side

= 4 × 12.5 = 50 m

(d) 100.25 m

Perimeter of square = 4 × side

= 4 × 100.25 = 40.1

3. Find the perimeter of parallelogram whose adjacent sides are given below:

(a) 12 cm, 6 cm

Perimeter of $||gm = 2$ (l+b)

$= 2$ (12+6)

$= 2 \times 18 = 36$ cm

(b) 10.5 cm, 2.8 cm

Perimeter of $||gm = 2$ (l+b)

$= 2$ (10.5+2.8)

$= 2 \times 13.3 = 26.6$ cm

(c) $5\frac{1}{2}$ cm, $3\frac{2}{3}$ cm

5.5 cm, 3.67 cm

Perimeter of $||gm = 2$ (5.5 + 3.67)

$= 2(20.16) = 40.34$

4. Find the perimeter of rhombs whose sides are given below:

(a) 12 cm

Perimeter of rhombs = 4a

$= 4 \times 16 = 64$ cm

(b) 2.25 cm

Perimeter of rhombs = 4a

$= 4 \times 2.25 = 9$ cm

(c) $9\frac{1}{2}$ cm = 9.5

Perimeter of rhombs = 4 a

$= 4 \times 9.5 = 38$ cm

(d) 6.25 cm

Perimeter of rhombs = 4a

$= 4 \times 6.25 = 25$ cm

5. Perimeter of rectangle = a+b+c

= 6+5+8 = 19

6. Perimeter of rectangle = a+b+c

= 5+5+8 = 18

7. Side = 6 cm

Perimeter of equilateral triangle = 3a

$= 3 \times 6 = 18$

8. Length : breadth = 6:5

Perimeter = 220 m

Perimeter = 2 (l+b)

$220 = 2\ (6x+5x)$

$x = \frac{110}{11}$ $\quad x = 10$

Length = $6x = 6 \times 10 = 60$ cm

Breadth = $5x = 5 \times 10 = 50$ cm

9. Let the breadth of field be x

Length of field = x + 10

Perimeter of field = 100 m

Perimeter = 2 (l+b)

$100 = 2\ (x+x+10)$

$50 = 2x + 10$

$= 50 - 10\ 2x$

$40 = 2x \qquad x = 20$

Length = 20+10 = 30 m

Breadth = 20 m

10. Perimeter of triangle = 40 cm

1st side be x

2nd side = $10+x$

3rd = $2x$

Perimeter of Δ = $x+10+x+2x$

$40 = 4x + 10$

$30 = 4x$

$x = 7.5$

1st side = 7.5 cm

2nd side = 17.5 cm

3rd = $2 \times 7.5 = 15$ cm

11. Smallest side = 40 cm

Larger side $= \frac{40 \times 7}{5} = 56$

Perimeter of $||gm = 2$ (56+40)

$= 2 \times 96 = 192$ m

12. Perimeter of $||gm$ 120 m

Perimeter = $2\ (2x+10)$

$= 120 = 2\ (2x+10)$

$= 60 = 2x + 10$

$50 = 2x \quad = 25$ m

1st side = 25 mm

2nd side = 25+10 = 35 m

Exercise - 11.2

1. Find the of rectangle whose length and breadth are given below:

(a) Length= 12 cm, breadth = 8 cm

Area $= l \times b$

$= 12 \times 8 = 96\ cm^2$

(b) Length = 10.5 cm, breadth = 6.4 cm

Area $= l \times b$

$= 64.4 \times 10.5 = 67.2\ cm^2$

(c) Length $= 3\frac{1}{4} = 3.25$ cm,

breadth $4\frac{1}{5} = 4.2$ cm

Area $= l \times b$

$= 3.25 \times 4.2 = 13.56\ cm^2$

(d) Length $= 8\frac{1}{2} = 8.5$ m $= 8.50$ cm breadth = 100 cm

Area $= l \times b$

$= 8.50 \times 100 = 85000\ cm^2$

2. Find he are of square whose side length given below:

(a) 15 cm

Area of square = side×side

$= 15 \times 15 = 225\ cm^2$

(b) 6.9 cm

Area of square = side×side

$= 6.9 \times 6.9 = 47.61\ cm^2$

(c) $6\frac{1}{3} = 6.34$ m

Area of square = side×side

$= 6.34 \times 6.34 = 40.11\ m^2$

(d) 10.5 cm

Area of square = side×side

$= 10.5 \times 10.5 = 110.25\ cm^2$

3. Find the are of Δ ABC if:

(a) $\angle A = 90°$, $AB = 6cm$, $AC = 8cm$

Area of $\Delta = \frac{1}{2} \times l \times h$

$= \frac{1}{6} \times 6 \times 8 = 24\ cm^2$

(b) $\angle B = 90°$, $AB = 18cm$, $BC = 9cm$

Area of $\Delta = \frac{1}{2} \times l \times h$

$= \frac{1}{6} \times 18 \times 9 = 81\ cm^2$

(c) $\angle C = 90°$, $AC = 4cm$, $BC = 5cm$

Area of $\Delta = \frac{1}{2} \times l \times h$

$= \frac{1}{6} \times 4 \times 5 = 10\ cm^2$

(d) $\angle C = 90°$, $BC = 17cm$, $AB = 8cm$

Area of $\Delta = \frac{1}{2} \times l \times h$

$= \frac{1}{6} \times 17 \times 8 = 68\ cm^2$

4. Base = 10 m

Height = 5 m

Area of $||gm$ = base × height

$= 10 \times 5 = 50\ m^2$

5. Side of rectangle = x and $x + 5$

Perimeter = 65

Perimeter = 2 (l+b)

$65 = 2\ (x+x+5$

$32.5 = 2x + 5$

$32.5 - 5 = 2x$

$27.5 = 2x$

$x = 13.75$ cm

Length = 1375 cm

Breadth = 18.75 cm

6. Area of rectangle field = 350 m^2

Length = 35 m

Let the breadth be x

Area $l \times b$

$350 = 35x \quad x = \frac{350}{35} \quad x = 10$ m

Perimeter = 2 (l+b)

$= 2\ (10+35) = 2 \times 45 = 90$ m

7. Perimeter of square = 64m

Let the side of square be x

Perimeter = $4 \times x$

$= 64 \times 4x$

$x = \frac{64}{4}$ $\quad x = 16$

Area of square = 16×16

$= 256\ m^2$

8. Length = 2 m 25 cm

1 m = 100 cm

= 200 + 25 = 225

Breadth = 1 m 50 cm

= 100 + 50 = 150 cm

Area of blackboard = 150×255

$= 33750\ cm^2$

Cost painting = 15×33750

= ₹ 506250

9. Side of square = 15 cm

Area of rectangle = $side^2$

$= 15 \times 15 = 225\ cm^2$

Let the length of rectangle be x

Area of rectangle = $l \times b$

$225 = x \times 10$

$225 = 10x$

$x = 22.5$

Length of rectangle = 22.5 cm

10. Let the length of altitude be x

Area of $||gm = 120\ cm^2$

Area of $|| = b \times h$

$120 = 15 \times$

$120 = 15x$

$x = \frac{120}{15}$ $x = 8$ cm

Length of altitude = 8 cm

11. AB = 15 cm

AC = 17 cm

Area of $\Delta = \frac{1}{2} \times b \times h$

$= \frac{1}{2} \times 15 \times 17 = \frac{255}{2}$

Area of $\Delta = 127.5\ cm^2$

12. Base of Δ = 16.2 cm

Area = $81\ cm^2$

Let the length be x

Area of $\Delta = \frac{1}{2} \times b \times h$

$81 = \frac{1}{5} \times x \times 16.2$

$81 = 8.1x$ $\quad x = \frac{81}{8.1}$

$x = 10$ cm

Length of Δ 10 cm

Exercise - 11.3

1. Side of park = 80 m

Area of park = $side^2$

$= 80 \times 80 = 6400\ m^2$

Side of square covering road and park = 88 m

Area of square = $88\ m^2$

$= 88 \times 88 = 7744\ m^2$

Area of path = $7744 - 6400$

$= 1344\ m^2$

Cost of gravelling the park

= 1344×12 = ₹ 16128

2. Side of lawn = 75 m and 50 m

Side of lawn after removing path

= 75 – 8 = 67 m and 50 – 8

= 42 m

Area of lawn = 75×50 m

$= 3750\ m^2$

Area of lawn after removing path

$= 67 \times 42 = 2814\ m^2$

Area of path = $3750 - 2814$

$= 936\ m^2$

3. Length and breadth of a room

= 10 m and 6 m

Width of border = 50 cm = 0.5 m

Area of room = $10 \times 6 = 60\ m^2$

Area of room after removing border = $9 \times 5 = 45\ m^2$

Area of border = $60 - 45 = 15\ m^2$

Cost of colowing of border

= 15×12 = ₹ 180

4. Length and breadth of park are = $3x$ and $2x$

Perimeter of park = $2 \times (3x + 2x)$

$500 = 2(3x$ and $2x)$

$250 = 5x \quad x = 50$

Area of park $= 15 \times 100$

$= 15000 \text{ m}^2$

Area of park removing path

$= 144 \times 94 = 13536$

Area of border = 15000 – 13536

$= 1464 \text{ m}^2$

Cost of graveling of path $1464 \times 22 =$ ₹ 29280

5. Dimension of field are = 250 m and 200 m

Width of road= 4 m

Area of field $= 250 \times 200$

$= 50{,}000 \text{ m}^2$

Length of field after removing roads $= 230 \times 20 = 230$ m

Area of field after removing roads

$= 230 \times 200 = 46000 \text{ m}^2$

Area covered by the road

$= 50{,}000 - 46000 = 4000 \text{ m}^2$

Area left $= 46000 \text{ m}^2$

6. **Find the are of shaded portion:**

(a) Length = 40 m

Breadth = 60 m

Area $= 40 \times 60 = 2400 \text{ m}^2$

Length of shaded portion

$= 40 - 4 = 36$ m

Breadth of unshaded portion

$= 60 - 4\ 56$ m

Area of unshaded portion = $36 \times 56 = 2016 \text{ m}^2$

Area of shaded potion = $2400 - 2016 = 384 \text{ m}^2$

(b) Area of shaded portion

$= (2\times3\times50) - (3)^2$

$= 300 - 9 = 291 \text{ m}^2$

7. Length of rectangle field = 500 m

Breadth of rectangle field

= 300 m

Width of path = 6 m

Area of path $= (6 \times 500 + 6 \times 300) - (6)^2$

$(3000+1800) - 36$

$= 4800 - 36 = 4764 \text{ m}^2$

8. Length table cover = 6 m

Breadth of table cover = 4 m

Area top of the table $= (6 - 0.5) \times (4 - 0.5)$

$= 5.5 \times 3.5 = 19.25 \text{ m}^2$

9. Length of rectangle = 75

Breadth of rectangle 50

Area of square $= 75 \times 50$

$= 3750 \text{ m}^2$

Area of square $= (8)^2$

$= 64 \text{ cm}^2$

Area of left cardboard $= 3750 - 4 \times 64$

$= 3750 - 256 = 3494 \text{ cm}^2$

10. Length = 60 m

Breadth = 40 m

Area of rectangle $= 60 \times 40$

$= 2400 \text{ m}^2$

Length $40 - (0.5+0.25)$

$40 = (-0.75) = 59.25$

Breadth $= 40 - (.5+0.20)$

$= 40 - 0.7 = 393$ m

Area of unshaded portion

$= 59.25 \times 39.3 = 2328.525 \text{ m}^2$

Area of shaded portion

$= 2400 - 2328.525 = 71.475 \text{ m}^2$

Exercise - 11.4

1. **Find the radios of circle with the following diameters:**

(a) 20 cm

$R = \frac{20}{2} \qquad R = 10$ cm

(b) $12\frac{1}{2} = \frac{25}{2}$ cm

$R = \frac{25}{2}$ $R = \frac{25}{4} = 6.25$cm

(c) 10.5 cm

$R = \frac{10.5}{2}$ R = 5.25 cm

(d) 8.4 cm

$R = \frac{8.4}{2}$ R = 4.2 cm

2. Find the circumference of circle with the following radios:

(a) 6.5 cm

D = 2R D = 13 cm

(b) $3\frac{1}{2}$ cm $\frac{7}{2}$ cm

D = 2R D = 7 cm

(c) 9.7 cm

D = 2R D = 19.4 cm

(d) 6 cm

D = 2R D = 12 cm

3. Find the circumference of circle with the following radios:

(a) r = 14 cm

Circumference $2\pi r$

$2 \times \frac{22}{7} \times 14$ = 88 cm

(b) r = 10 cm

Circumference $2\pi r$

$2 \times \frac{22}{7} \times 10 = \frac{440}{7}$

= 62.85 cm

(c) r = 28.7 cm

Circumference $2\pi r$

$2 \times \frac{22}{7} \times 28$ = 180.4 cm

(d) r = 3.01 cm

Circumference $2\pi r$

$2 \times \frac{22}{7} \times 3.01$

$= \frac{132.44}{7} = 18.92$ cm

4. Find the circumference of circle with the following diameters:

(a) 14 cm

$r = \frac{D}{2}$ $r = \frac{14}{2}$ r = 7 cm

Circumference $2\pi r$

$2 \times \frac{22}{7} \times 7$ = 44 cm

(b) 25 cm

$r = \frac{D}{2} = \frac{25}{2} = 12.5$cm

Circumference $2\pi r$

$2 \times \frac{22}{7} \times 12.5 = \frac{550}{7}$

= 78.57 cm

(c) 56 cm

$r = \frac{D}{2} = \frac{56}{2} = 28$cm

Circumference $2\pi r$

$2 \times \frac{22}{7} \times 28$ = 78.57 cm

(d) 7 cm

$r = \frac{D}{2} = \frac{7}{2} = 3.5$cm

Circumference $2\pi r$

$2 \times \frac{22}{7} \times 3.5 = \frac{154}{7}$ = 22 cm

5. Find the area of circle with the following radios:

(a) 7.7 cm

Area πr^2

$= \frac{22}{7} \times 7.7$ = 186.34 cm^2

(b) 14.14 cm

Area πr^2

$= \frac{22}{7} \times 14.14$ = 696.96 cm^2

(c) 21 cm

Area πr^2

$= \frac{22}{7} \times 21 = 1386 \text{ cm}^2$

(d) 8.2 cm

Area πr^2

$= \frac{22}{7} \times 8.2 = \frac{147928}{7}$

$= 211.32 \text{ cm}^2$

6. Find the area of circle with the following diameters:

(a) 21 cm $r = \frac{21}{2} = 10.5$

Area πr^2

$= \frac{22}{7} \times 10.5 = \frac{24255}{7}$

$= 346.5 \text{ cm}^2$

(b) 56 cm $r = \frac{56}{2} = 28$

Area πr^2

$= \frac{22}{7} \times 28 = 2464 \text{ cm}^2$

(c) 14 cm $r = \frac{21}{2} = 7$

Area πr^2

$= \frac{22}{7} \times 7 = 154 \text{ cm}^2$

(d) 10 cm

$r = \frac{10}{2} = 5$

Area πr^2

$= \frac{22}{7} \times 5 \times 5 = \frac{550}{7}$

$= 78.57 \text{ cm}^2$

7. Circumference = 44

Area $2\pi r = 44$

$\pi r = \frac{44}{2}$ $\pi r = 22$

$r = \frac{22}{\pi}$ $r = 7\text{cm}$

8. Ratio of circle = 1:2

Circumference of 1st circle = circumference 2nd circle

$2\pi r = 2\pi r$

$2\pi \times 1 = 2\pi \times 2 = 1 : 2$

9. Ratio of radios = 1 : 2

Area of 1st circle = Area 2nd circle

$\pi r_1^2 = \pi r_2^2$

$\pi(1)2^2 \pi(2)^2 \ 1 = 4$

10. Length = 36 cm

Breadth = 20 cm

Perimeter of rectangle = 2 (l + b)

= 2 (36+20)

= 2 × 56 = 112

Circumference of circle = $2\pi r$

$112 = 2\pi r \quad r = \frac{112}{2\pi}$

$r = \frac{28 \times 7}{11} = \frac{17}{81} \text{cm}$

Area of circle = πr^2

$= \frac{22}{7} \times 17.81 \times 17.81 = 999.35 \text{ cm}^2$

11. Radius = 49 cm

Circumference = $2\pi r$

$= 2\frac{22}{7} = 49 \qquad r = 308 \text{ cm}^2$

12. Circumference = $2\pi r$

$88 = 2\pi r$

$\frac{88}{2\pi} = r$

$\frac{44}{\pi} = r \quad \frac{44 \times 7}{22} = r \qquad r = 14$

Multiple choice Question:

1. c 2. a 3. c 4. c 5. a

NCERT CORNER

Fill in the blanks:

1. 2(l+b) 2. Perimeter 3. $\pi \times d$

4. $\frac{1}{2}ab$ 5. Radius

True and False:

1. True 2. True 3. False 4. False

5. False

Chapter-12

Exercise - 12.1

1. Write the factors of the following terms:

(a) $3 \times 5 \times a \times b \times c$
(b) $3 \times a \times a \times a \times b$
(c) $-2 \times 2 \times 2 \times p \times q \times q$
(d) $2 \times 3 \times 3 \times p \times q \times q \times r \times r$
(e) $-3 \times 3 \times p \times q \times q$
(f) $-2 \times x \times x \times y \times y \times z \times z$
(g) $2 \times 2 \times 2 \times 2 \times x \times y \times y \times z$
(h) $-5 \times a \times x$
(i) $5 \times 7 \times x \times x \times y \times y \times z \times z$
(j) $-p \times q \times r$

2. (a) Monomial (b) Trinomial
(c) Binomial (d) Trinomial
(e) Monomial (f) Trinomial
(g) Binomial (h) Monomial

3. Identify by the constant term in the following expression:

(a) 8 (b) No constant term
(c) 20 (d) 2
(e) No constant term
(f) No constant term
(g) 16 (h) No constant term

4. Write the coefficient of the variables given in brackets:

(a) $-5y$ (b) 1 (c) $2x$
(d) -1 (e) -1 (f) 7
(g) x^2 (h) -10

5. Separate the term of following algebraic expression:

(a) $-2x, 4y, z$ (b) $x^2, -y^2, -z$
(c) $2x, -4y, -z$ (d) ax, by, c^2
(e) $x^2, y^2, z^2, 2xy, -2yz, -2zx$
(f) $x^3, y^3, -3x^2y, 2xy, -3y^2x$
(g) $40, -x^2, y^2, 2xy$

6. Write the algebraic expression whose term are given below:

(a) $4xy - 5x + 7yz$
(b) $x^2 - y^2 + xy$
(c) $a^2 + b^2 + z^2$
(d) $20 - y^2 - x^2$
(e) $x^2 - x - 10$
(f) $x^3 - b^3 - 3ab^2$

7. Identify the like terms in the following term:

(a) $4xy$ and $-5xy$
$8x^2$ and $-9x^2$
(b) $2x^2y$ and $-5x^2y$
$3xy^2$ and $-7y^2x$
(c) pqr^2 and $4qpr^2$
$-p^2qr$ and $7qp^2r$
(d) No like term
(e) ab^2 and $-b^2a$
$-ba^2$ and $-a^2b$
(f) $x^2, -5x^2$ and $7x^2$

8. Find the value of following expression:

(a) a = 1, b = 2, c = 3
$= 1 + 2 + 3 = 6$
(b) $1 \times 2 + 2 \times 3 + 3 \times 1$
$= 2 + 6 + 3 = 11$
(c) $(1)^2 + (2)^2 + (3)^2$
$= 1 + 4 + 9 = 14$
(d) $2 \times 1 + 2 - (3)^2$
$2 + 2 - 9 \quad 4 - 9 = -5$
(e) $(1)^2 + (2)^2 + 3 \times 1 \times (2)^2 + 3 \times (1)^2 \times (2)^2$
$= 1 + 8 + 12 + 6 = 27$
(f) $(1+2)(1+(3)^2 - 1 - 2)$
$3(1+4-2)$
$3(5-2) \quad 3 \times 3 = 9$

9. Arrange the following polynomials:

(a) $x^2y^2 + x^2y + xy + 9$
(b) $-8x^3 + 7x^2 - 3x + 10$
(c) $xyz - xy + x + 2z$
(d) $2x^2y^2 + 24x^2 - 7y^2$

10. Write two examples each the following:

(a) $3x, 8x^2$
(b) $3x + 2, 2x^2 + 3$

(c) $3x^2+4x+6, 3x^3+9x^2+6$

Exercise - 12.2

1. Find the sum of following:

(a) $2x, \div 3x, 8x, -7x$

$2x+(-3x)+8x+(-7x)$

$2x-3x+8x-7x$

$10x-10x=0$

(b) $7x^2y-5x^2y, -2x^2y, x^2y$

$7x^2y+(-5x^2y)+(-2x^2y)+(x^2y)$

$7x^2y-5x^2y-2x^2y+x^2y$

$7x^2y+x^2y-5x^2y-2x^2y$

$8x^2y-7x^2y=x^2y$

(c) $xy, -2xy, -7x\ \ y, 3xy$

$xy+(-2xy)+(-7xy)+3xy$

$xy-2xy-7xy+3xy$

$xy+3xy-2xy-7xy$

$4xy-9xy=-5xy$

(d) $m, 5m, -n, +7n$

$m+5m+(-n)+7n$

$m+5m-n+7n$

$6m+7-n-n$

$6m+6n$

(e) $x^2, 7y^2, 8x, -2y$

$x^2+7y^2+8x-2y$

(f) $9xy, 8x^2, -7xy, -6x^2$

$9xy+(-7xy)+8x^2+(-6x^2)$

$9xy-7xy+8x^2-6x^2$

$-2xy+2x^2$

(g) $8x^2y, -yx^2, 9yx^2, -5x^2y$

$8x^2y+(-yx^2)+9yx^2+(-5x^2y)$

$8x^2y-yx^2+9yx^2-5x^2y$

$8x^2y-5x^2y+9yx^2-yx^2$

$8x^2y+9yx^2-5x^2y-yx^2$

$17x^2y-6x^2y$

$11x^2y$

(h) pqr, –qpr, rpq, –qrp

pqr + (–qpr) + (rpq) + (–qrp)

pqr – qpr + qrpq – qrp

(i) $9xyz-3xy, 5xy, 7x$

$9xyz-3xy+5xy+7x$

$9xyz-3xy12xy$

$9xyz-9xy$

(j) pq^2+qp^2, pqr, rpq

pq^2+qp^2, pqr, rpq

pq^2+qp^2

2. Add the following expression:

(a) $x+y+z, 2x+2y+2z, -3x-3y-3z$

$=x+y+z+2x+2y+2z+(-3x-3y-3z)$

$=x+y+z+2x+2y+2z-3x-3y-3z$

$=x+2x-3x+y+2y-3y+z+2z-y-3z=3x-3x+3y-3y+3z+3z$

(b) $6x^2-4y^2-2z^2, -8x^2+3y^2+7z^2, -9z^2-2x^2+7y^2$

$=6x^2-4y^2-2z^2+(-8x^2+3y^2+7z^2)+(-9z^2-2x^2+7y^2)$

$=6x^2-4y^2-2z^2-8x^2+3y^2+7z^2-9z^2-2x^2+7y^2$

$=6x^2-8x^2-2x^2+y^2+3y^2+7y^2-2z^2+7z^2-9z^2$

$=6x^2-10x^2+11y^2-11z^2+7z^2$

$=-4x^2+11y^2-4z$

(c)

$5xy+7yz-9zx, -8zx+3xy, -7xy+4yz$
$=5xy+7yz-9zx+(-8zx+3xy)+(-7xy+4yz)$
$=5xy+7yz-9zx-8zx+3xy-7xy+4yz$
$=5xy+3xy-7xy+7yz+4yz-9zx-8zx=8xy-7xy+11z-17xz$
$=xy+11yz-17xz$

(d) $abc+a^2+b^2+c^2, -a^2+b^2-c^2-2abc, abc+2a^2-2b^2$
$=abc+a^2+b^2+c^2+(-a^2+b^2-c^2-2abc+abc+2a^2-2b^2$
$=abc+a^2+b^2+c^2-a^2+b^2-c^2-2abc+abc+2a^2-2b^2$
$=abc-2abc+abc+a^2-a^2+2a^2+b^2+b^2-2b^2+c^2-c^2$
$=2abc-2abc+3a^2-a^2+2b^2-2b^2+0=0+2a^2+0+0=2a^2$

(e) $6p^2+7q^2-3pqr, -8p^2-3q^2+7pqr, 2p^2-9pqr$
$=6p^2+7q^2-3pqr+(-8p^2-3q^2+7pqr)+(2p^2-9pqr)$
$=6p^2+7q^2-3pqr-8p^2-3q^2+7pqr+2p^2-9pqr$
$=8p^2+8p^2+2p^2+7q^2+3q^2-3pqr+7pqr-9pqr$
$=8p^2-8p^2+4q^2-12pqr+7pqr$
$=4q^2-5pqr$

(f) $a^2+b^2+c^2+2ab+2bc+2ca, -2a^2-3b^2-4c^2-2ab-2bc-2ca$
$=a^2+b^2+c^2+2ab+2bc+2ca+(-2a^2-3b^2-4c^2-2ab-2bc-2ca)$
$=a^2+b^2+c^2+2ab+2bc+2ca-2a^2-3b^2-4c^2-2ab-2bc-2ca)$
$=a^2+2a^2+b^2-3b^2+c^2-4c^2+2ab-2ab+2ab+bc-2bc+2ca-2ca)$
$=-a^2-2b^2-3c^2+0+0+0$
$=-a^2-2b^2-3c^2$

(g) $xy+yz+zx+5, -2xy-3yz-3, 3zx+8$
$=xy+yz+zx+5+(-2xy-3yz-3)+(3zx+8)$
$=xy+yz+zx+5-2xy-3yz-3+3zx+8$
$=xy+2xy+yz-3yz+zx+3zx+5-3+8=-xy+2yz+4zx+13-3$
$=-xy-2yz+4zx+10$

(h) $x^2+y^2+2xy, -y^2-xy, -x^2-xy$
$=x^2+y^2+2xy+(-y^2-xy)+(-x^2-xy)$
$=x^2+y^2+2xy-y^2-xy-x^2-xy=x^2-x^2+y^2-y^2-2xy-xy-xy$
$=0+0+2xy-2xy$
$=0+0+0$

(i) $9m+8n+2p, -3m-2p, -7n+p+q$
$=9m+8n+2p+(-3m-2p)+(-7n+p+q)$
$=9m+8n+2p-3m-2p+-7n+p+q$
$=9m-3m+8n-7n+2p-2p+p++q=6m+n+3p-2p+q$
$=6m+n+p+q$

3. Subtract the following:

(a) $3xy-9xy=6xy$

(b) $8y^2-8x^2$

(c) $-35y^2x^2-45x^2y^2 \quad =-70y^2x^2$

(d) $-7x^2(-9x^2)=-7x^2+9x^2=2x^2$

(e) $60a^2-35a^2b^2$

(f) $5xy-(-8xy)$
$=5xy+8xy=13xy$

$5xy+7yz-9zx, -8zx+3xy, -7xy+4yz$

(g) $30xy-(-20xy)$
$=30xy+20xy=50xy$

(h) $0-8x=-8x$

(i) $7x^2-0=7x^2$

4. Subtract the following:

(a) $-9x-2y-(8x+7y)$
$=-9x-2y-8x-7y$
$=-9x-8x-2y-7y$
$=-17x-9y$

(b) $8x^2+9x-70-(2x^2-4x+10)$
$=8x^2+9x-70-2x^2+4x-10$
$=8x^2-2x^2+9x+4x-70-10$
$=6x^2+13x-80$

(c) $-5xy+3yz-8xz-(2xy-2yz+2zx)$
$-=5xy+3yz-8xz-2xy+2yz+2zx$
$=-5xy-2xy+3yz+2yz-8zx+2zx$

(d) $x^2-2y^2-(x^2+y^2)$
$=x^2-2y^2-x^2-y^2$

(e) $x^2+y^2-2xy-(x^2+y^2+2xy)$
$=x^2+y^2-2xy-x^2-y^2-2xy$
$=-2xy-2xy=-4xy$

(f) $x^2+y^2-2xy-(x^2+y^2+2xy)$
$=x^2+y^2-2xy-x^2-y^2-2xy$
$=x^2-x^2+y^2-y^2-2xy-2xy$
$=0+0-4xy=-4xy$

(g) $-9mnp+8r^2-(4mnp+3r^2)$
$-9mnp+8r^2-4mnp-3r^2$
$-9mnp-4mnp+8r^2-3r^2$
$-13mnp+5r^2$

(h) $x^2+y^2+z^2+2xy+2yz+2zx-200$

(i) $6p^2-7rs+18pqr-(6p^2+7q^2+8r^2+3pqr)$
$=6p^2-7rs+18pqr-6p^2-7q^2-8r^2-3pqr$
$=6p^2-6p^2-7q^2-7rs+18pqr-3pqr-8r^2=0-7q^2+1$

5. Let the number should be added= a
$5xy+7x^2+a=2y^2+3xy$
$a=2y^2+3xy-5xy-7x^2$
$a=2y^2+3xy-2xy$

6. $(-5xy+8x+2y+7xy-8x+3y)-(9xy-x+3y-3xy)$
$=-5xy+8x+2y+7xy-8x+3y-9xy+3x+3y-3xy$
$=-5xy+7xy+9xy+3xy+8x-8x+3x+2y+3y-3y=14xy+3xy+2y$

7. Let the no. should be added a
$11x^3-3y^2+22xy+a=8x^3+ay^2-15xy$
$a=8x^3+ay^2-15xy-11x^3+3y^2-22xya=3x^3 12y^2-37xy$

8. Let the no should be subtracted = a
$12x^3+5x^2-9x+5-a=-7x^2+3x^3-8x+11$
$-a=-7x^2+3x^3-8x+11-(12x^3+5x^2+9x+5)$
$-a=-7x^2+3x^2-8x+11-12x^3+5x^2+9x-5$

$-a = -7x^2 - 3x^3 - 8x + 11 - 12x^3 - 5x^2 + 9x - 5$
$-a = -7x^2 - 5x^2 + 3x^2 - 12x^3 - 8x + 9x + 11 - 5$
$-a = -12x^2 - 9x^3 + x + 6$
$a = 12x^2 + 9x^3 - x - 6$
So, the no. is $12x^2 + 9x^3 - x - 6$

9. Let the third algebraic expression be a
$-6x^3 - 2x^2 - 9x - 6 + (-3x^2 + 8x^3 + 10x + 7) + a = 18x^3 + 17x^2 + 5x + 15$
$a = +18x^3 + 17x^2 + 5x + 6x^3 + 2x^2 + 9x + 6 + 3x^2 - 8x^3 - 10x - 7$
$a = +18x^3 + 6x^3 - 8x^3 + 17x^2 + 2x^2 + 3x^2 + 5x + 9x - 10x + 6 - 7$
$a = 16x^3 + 22x^2 + 4x - 1$
So, the third algebraic are $= a = 16x^3 + 22x^2 + 4x - 1$

10. Side of a triangle are $= 3x^2 + 4y^2 - 7xy, -8x^2 - 9y^2 + 8xy$ and $9x^2 + 12$
So, the perimeter of triangle
$= 3x^2 + 4y^2 - 7xy + (-8x^2 - 9y^2 + 8xy) + (-9x^2 + 12)$
$= 3x^2 + 4y^2 - 7xy - 8x^2 - 9y^2 + 8xy - 9x^2 + 12$
$= 3x^2 - 8x^2 - 9x^2 + 4y^2 - 9y^2 - 7xy + 8xy + 12$
$= 14x^2 - 5y^2 + xy + 12$

M.C.Q

1. (b) **2.** (b) **3.** (a) **4.** (b)

NCERT CORNER

Fill in the blanks:

1. Trinomial **2.** y^2z and z^2y **3.** Unlike **4.** 14

Chapter-13

Exercise - 13.1

1. Find the value each of the following :

(a) 2^6 $2 \times 2 \times 2 \times 2 \times 2 \times 2 = 64$ (b) 3^5 $3 \times 3 \times 3 \times 3 \times 3 = 243$
(c) 9^5 $9 \times 9 \times 9 \times 9 \times 9$ (d) 11^3 $11 \times 11 \times 11$
(e) 6^3 $6 \times 6 \times 6$ (f) $(-3)^4$ $-3 \times -3 \times -3 = -27$
(g) 8^3 $8 \times 8 \times 8 = 512$ (h) $(-3)^5$ $-2 \times -2 \times -2 - 2 \times -2 = -32$
(i) 10^4 $10 \times 10 \times 10 \times 10 = 10000$ (j) $(-12)^3$ $-12 \times -12 \times -12 = -1828$
(k) $(-9)^4$ $-9 \times -9 \times -9 - 9 = -6561$

2. Identify base and exponents in each of the following:

(a) Base – **5** Exponents – 4 (b) Base – 2 Exponents – 0
(c) Base – 9 Exponents – (–2) (d) Base – (–6) Exponents – 3
(e) Base – **5** Exponents – 5 (f) Base – (–8) Exponents – (10)
(g) Base – x Exponents – y (h) Base – (–y) Exponents – x
(i) Base – **a** Exponents – a (j) Base – (–100) Exponents – 2
(k) Base – 3 Exponents – 3 (l) Base – 10 Exponents – x+y

3. Simplify:

(a) $2^3 \times 4^2$ $2 \times 2 \times 2 \times 4 \times 4 = 128$

(b) $(-3)^2 \times (-5)^3$

$-3 \times -3 \times -5 \times -5 \times -5 = -1125$

(c) $2^5 \times (-3)^6$

$2 \times 2 \times 2 \times 2 \times 2$

$= -3 \times -3 \times -3 \times -3 \times -3 \times -3$

$= 23328$

(d) $5^2 \times (-6)^3$

$5 \times 5 \times -6 \times -6 \times -6 = -5400$

(e) $\left(\frac{-2}{3}\right)^2$

$= \frac{-2}{3} \times \frac{-2}{3} \times \frac{-2}{3} \times \frac{-2}{3} \times \frac{-2}{3}$

$= \frac{-32}{243}$

(f) $\left(\frac{1}{10}\right)^3 = \frac{1}{10} \times \frac{1}{10} \times \frac{1}{10} = \frac{1}{1000}$

(g) $\left(\frac{-12}{13}\right)^2 = \frac{-12}{13} \times \frac{-12}{13} = \frac{144}{169}$

(h) $\left(\frac{-9}{10}\right)^2 = \frac{-9}{10} \times \frac{-9}{10} = \frac{81}{100}$

5. Which one is greater in the following pair:

(a) 2^6 [ ] 6^2

$2 \times 2 \times 2 \times 2 \times 2 \times 2$, 6×6

64 [>] 36

(b) 3^2 [ ] 5^2 $\quad 3 \times 3$ [ ] 5×5

9 [<] 25

(c) $(-3)^3$ or $(-4)^3$

$-3 \times -3 \times -3$ [ ] $-4 \times -4 \times -4$

-27 [>] -64

(d) 4^2 [ ] 2^4

4×4 [ ] $2 \times 2 \times 2 \times 2$

$16 = 16$

(e) 6^3 [ ] 3^6

$6 \times 6 \times 6$ [ ] $3 \times 3 \times 3 \times 3 \times 3 \times 3$

216 [<] 729

(f) $(-2)^5$ or $(-10)^2$

$-2 \times -2 \times -2 - 2 \times -2$ [ ]

-10×-10

-32 [<] 100

6. Express each of the following in exponential form:

(a) $(3)^5$ (b) $(2)^4 \times (3)^3$

(c) $(-5)^3 \times (-6)^3 \times (-7)^3$

(d) $(4)^3 \times (x)^3 \times (y)^3 \times (z)^3$

$= (4xyz)^3$

(e) $(a)^3 \times (b)^3 \times (c)^3 = (abc)^3$

(f) $\left(\frac{-5}{9}\right)^5$

(g) $\left(\frac{2}{3}\right)^3 \times (a)^2 \times b \times (c)^2$

7. Express each of the following numbers in exponential form:

(a) 125

5	125
5	25
5	5
	1

$5 \times 5 \times 5 = (5)^3$

(b) 1024

2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = (2)^8$

(c) 729

3	729
3	243
3	81
3	27
3	9
3	3
	1

$3\times3\times3\times3\times3\times3=(3)^6$

(d) 216

2	216
2	108
2	54
3	27
3	9
3	3
	1

$=2\times2\times2\times3\times3\times3$

$=(2)^3\times(3)^3=(2\times3)^3$

(e) 625

5	625
5	125
5	25
5	5
	1

$5\times5\times5\times5=(5)^4$

(f) 3200

2	3200
2	1600
2	800
2	400
2	200
2	100
2	50
5	25
5	5
	1

$2\times2\times2\times2\times2\times2\times2\times2\times5\times5$

$=(2)^8\times(5)^2$

(g) 144

2	144
2	72
2	36
2	18
3	9
3	3
	1

$=2\times2\times2\times2\times3\times3$

$=(2)^4\times(3)^2$

(h) 2025

5	2025
5	405
3	81
3	27
3	9
3	3
	1

$=5\times5\times3\times3\times3\times3$

$=(5)^2\times(3)^4$

(i) 500

2	500
2	250
5	125
5	25
5	5
	1

$=2\times2\times5\times5\times5$

$=(2)^2\times(5)^3$

(j) 3125

5	3125
5	625
5	125
5	25
5	5
	1

$=5\times5\times5\times5\times5$

$=(5)^5$

8. Express each of the rational numbers in exponential form:

(a) $\frac{8}{27}$ $\quad \frac{2\times2\times2}{3\times3\times3}=\left(\frac{2}{3}\right)^3$

2	8
2	4
2	2
	1

3	27
3	9
3	3
	1

(b) $\frac{-27}{125}$ $\quad \frac{3\times3\times3}{5\times5\times5}=-\left(\frac{3}{5}\right)^3$

3	27
3	9
3	3
	1

5	125
5	25
5	5
	1

(c) $\frac{-32}{243}$ $\quad \frac{2\times2\times2\times2\times2}{3\times7\times7} = \frac{(2)^5}{(7)^3}$

2	32
2	16
2	8
2	4
2	2
	1

7	343
7	49
7	7
	1

(d) $\frac{-16}{81}$ $\quad \frac{2\times2\times2\times2}{3\times3\times3\times3} = -\left(\frac{2}{3}\right)^4$

2	16
2	8
2	4
2	2
	1

3	81
3	27
3	9
3	3

(e) $\frac{36}{64}$ $\quad \frac{2\times2\times3\times3}{2\times2\times2\times2\times2\times2}$

(f) $\frac{343}{729}$ $\quad = \frac{7\times7\times7}{3\times3\times3\times3\times3\times3}$

$= \frac{(7)^3}{(3)^6}$

2	36
2	18
3	9
3	3
	1

2	64
2	32
2	16
2	8
2	4
2	2
	1

(g) $\frac{64}{15625}$

$= \frac{2\times2\times2\times2\times2\times2}{5\times5\times5\times5\times5\times5}$

$\frac{(2)^6}{(5)^6} = \left(\frac{2}{5}\right)^6$

2	64
2	32
2	16
2	8
2	4
2	2
	1

2	15625
2	3125
2	625
2	125
2	25
2	5
	1

(h) $\frac{169}{36}$

$= \frac{13\times13}{2\times2\times3\times3} = \frac{(13)^2}{(2)^2\times(3)^2}$

13	169
13	13
	1

2	36
2	18
3	9
3	3
	1

(i) $\frac{9}{49}$ $\quad = \frac{3\times3}{7\times7} = \frac{(3)^2}{(7)^2} = \left(\frac{3}{7}\right)^2$

3	9
3	3
	1

7	49
7	7
	1

(j) $\frac{256}{225}$

$= \frac{2\times2\times2\times2\times2\times2\times2\times2}{5\times5\times3\times3}$

$= \frac{(2)^8}{(5)^2\times(3)^2}$

2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

5	225
5	45
3	9
3	3

9. Simplify the following:

(a) $\left(\frac{-2}{3}\right)^2 \times (3)^2 \times \left(\frac{1}{-2}\right)^2$

$$= \frac{-2}{3} \times \frac{-2}{3} \times 3 \times 3 \times \frac{1}{-2} \times \frac{1}{-2} = 1$$

(b) $\left(\frac{4}{7}\right)^2 \times \left(\frac{2}{3}\right)^2 \times \left(\frac{3}{4}\right)^3$

$$= \frac{4}{7} \times \frac{4}{7} \times \frac{2}{3} \times \frac{2}{3} \times \frac{3}{4} \times \frac{3}{4}$$

$$= \frac{2 \times 2}{7 \times 7} = \frac{4}{49}$$

10. If a = 1, b = 2, c = 3 then find the value each of the following:

(a) abc

Put $a = 1, b = 2, c = 3$

$1 \times 2 \times 3 = 6$

(b) a^2bc

Put $a = 1, b = 2, c = 3$

$(1)^2 \times 2 \times 3 = 1 \times 2 \times 3 = 6$

(c) ab^2c

Put $a = 1, b = 2, c = 3$

$1 \times (2)^2 \times 3$

$1 \times 4 \times 3 = 12$

(d) abc^2

Put $a = 1, b = 2, c = 3$

$1 \times 2 \times (3)^2$

$2 \times 9 = 18$

(e) $a^2b^2c^2$

Put $a = 1, b = 2, c = 3$

$(1)^2 \times (2)^2 \times (3)^2$

$4 \times 9 = 36$

(f) $a^2 + b^2 + c^2$

Put $a = 1, b = 2, c = 3$

$(1)^2 + (2)^2 + (3)^2$

$1 + 4 + 9 = 14$

(g) $a^0b^0c^0$

Put $a = 1, b = 2, c = 3$

$1^0 + 2^0 + 3^0$

$0 + 0 + 0 = 0$

(h) $a^0 \times b^0 + c^0$

Put $a = 1, b = 2, c = 3$

$1^0 \times 2^0 \times 3^0$

$0 \times 0 \times 0 = 0$

Exercise - 13.2

1. Simplify the following write in exponential form:

(a) $(2)^8 \times (2)^5$ $[a \times^m \times a^n = a^{m+n}]$

$(2)^{8+5}$ $(2)^{13}$

(b) $9^6 \times 9^3$ $[a \times^m \times a^n = a^{m+n}]$

$(9)^{6+3}$ $(9)^9$

(c) $\left(\frac{5}{8}\right)^2 \times \left(\frac{5}{8}\right)^6$

$[a \times^m \times a^n = a^{m+n}]$

$\left(\frac{5}{8}\right)^{2+6}$ $\left(\frac{5}{8}\right)^8$

$\therefore (a)^m \times (a)^n \times (a)^o = (a)^{m+n+o}$

(d) $\left(\frac{a}{b}\right)^4 \times \left(\frac{-a}{b}\right)^7$

$\left(\frac{-a}{b}\right)^{4+7}$ $\left(\frac{-a}{b}\right)^{11}$

$\therefore (a)^m \times (a)^n \times (a)^o = (a)^{m+n+o}$

(e) $x^2 \times x^4 \times x^6$

$(x)^{2+4+6}$ $(x)^{12}$

$\therefore (a)^m \times (a)^n \times (a)^o = (a)^{m+n+o}$

(f) $\left(\frac{x}{y}\right)^a \times \left(\frac{x}{y}\right)^b \times \left(\frac{x}{y}\right)^c$

$\left(\frac{x}{y}\right)^{a+b+c}$ $\left(\frac{-a}{b}\right)^{11}$

$\therefore (a)^m \times (a)^n \times (a)^o = (a)^{m+n+o}$

2. Simplify the following and write answer in exponential form:

(a) $(-7)^9 \div (-7)^2$

$(-7)^{9-2}$ $\therefore (a)^m \div (a)^n = (a)^{n-m}$

$(-7)^7$

(b) $8^5 \div 8^2$

$(8)^{5-2}$ $\therefore (a)^m \div (a)^n = (a)^{n-m}$

$(8)^3$

(c) $\left(\frac{2}{3}\right)^9 \div \left(\frac{2}{3}\right)^7$

$\left(\frac{2}{3}\right)^{9-7}$ $\therefore (a)^m \div (a)^n = (a)^{n-m}$

$\left(\frac{2}{3}\right)^2$

(d) $x^y \div x^z$

$(x)^{y-x}$ $\therefore (a)^m \div (a)^n = (a)^{n-m}$

(e) $\left(\frac{-5}{9}\right)^{10} \div \left(\frac{-5}{9}\right)^{10}$

$\left(\frac{-5}{9}\right)^{10-10}$ $\therefore (a)^m \div (a)^n = (a)^{n-m}$

$\left(\frac{-5}{9}\right)^{0} = 1$

(f) $a^5 \div a^3$

$(a)^{5-3}$ $\therefore (a)^m \div (a)^n = (a)^{n-m}$

$= (a)^2$

3. Simplify the following and write in exponential form:

(a) $(2^4)^2 = (2)^{4\times2} = (2)^8$

$\therefore (am)^n = (a)^{mn}$

(b) $(3^5)^3 = (3)^{5\times3} = (3)^{15}$

$\therefore (am)^n = (a)^{mn}$

(c) $(5^4)^6 = (5)^{4\times6} = (5)^{24}$

$\therefore (am)^n = (a)^{mn}$

(d) $(10^2)^4 = (10)^{2\times4} = (10)^8$

$\therefore (am)^n = (a)^{mn}$

(e) $(7^3)^0 = (7)^{3\times0} = (7)^0$

$\therefore (am)^n = (a)^{mn}$

(f) $(-6^2)^3 = (-6)^{2\times3} = (-6)^6$

$\therefore (am)^n = (a)^{mn}$

(g) $(-8^3)^5 = (-8)^{3\times5} = (-8)^{15}$

$\therefore (am)^n = (a)^{mn}$

(h) $(4^2)^3 = (4)^{3\times2} = (4)^6$

$\therefore (am)^n = (a)^{mn}$

(i) $(6^2)^5 = (6)^{2\times5} = (6)^{10}$

$\therefore (am)^n = (a)^{mn}$

(j) $(10^5)^0 = (10)^{5\times0} = (10)^0$

$\therefore (am)^n = (a)^{mn}$

4. Simplify the following and write in exponential form:

(a) $(x^a)^b = x^{a\times b} = x^{ab}$

(b) $(x^2)^b = x^{2\times b} = x^{2b}$

(c) $(x^x)^z = x^{x\times z} = x^{xz}$

(d) $(a^2)^3 = (a)^{2\times3} = (a)^6$

(e) $(3^x)^2 = 3^{x\times2} = 3^{2x}$

(f) $(y^3)^x = y^{3\times x} = y^{3x}$

(g) $(a^6)^0 = a^{6\times0} = a^0 = 1$

(h) $(9^x)^y = 9^{x\times y} = 9^{xy}$

(i) $(5^3)^z = 5^{3\times x} = 5^{3x}$

(j) $(-7^x)^8 = (-7)^{x\times8} = (-7)^{8x}$

5. Express as a single exponent:

(a) $5^3 \times 4^3$

$(5\times4)^3 = (20)^3$

(b) $(-7)^3 \times (-2)^3$

$(-7\times-2)^3 = (14)^3$

(c) $2^5 \times 6^5$

$(2\times6)^5 = (12)^5$

(d) $p \times y^p$

$(x\times y)^p = (xy)^p$

(e) $3^5 \times a^5$

$(3\times a)^5 = (3a)^5$

(f) $3^x \times 7^x$

$(3\times7)^x = (21)^x$

(g) $4^y \times 9^y$

$(4\times9)^y = (36)^y$

(h) $5^a \times 7^a$

$(5\times7)^a = (35)^a$

6. Simplify:

(a) $10^0 = 1$ $[(a)^x \div (a)^y = (a)^{x-y}]$

(b) $7^5 \div 7^5$

$(7)^{5-5}$ $[\therefore a^0 = 1]$

$(7)^0 = 1$

(c) $5^0 \times 6^0$

$1\times1 = 1$ $[\therefore a^0 = 1]$

(d) $p^0 \div q^2$

$i \times q^2 = q^2$ $[\therefore p^0 = 1]$

(e) $x^0 \times xy^0$

$1\times x\times1 = x$ $[\therefore a^0 = 1]$

(f) $\left(\frac{2}{3}\right)^5 \div \left(\frac{2}{3}\right)^5$

$\left(\frac{2}{3}\right)^{5-5}$ $[\therefore a^0 = 1]$

$\left(\frac{2}{3}\right)^0$

(g) $\left(\frac{x}{y}\right)^0 \times \left(\frac{x}{y}\right)^9$

$$\left(\frac{x}{y}\right)^{0+9} = \left(\frac{x}{y}\right)^{9}$$

(h) $(3^0)^x = 3^{0\times x} = 3^0 = 1$

7. Express the following with negative exponents:

(a) $\frac{1}{25} = (2)^{-5}$ (b) $\frac{1}{38} = (3)^{-8}$

(c) $\frac{x^2}{x^3} = (x)^{2-3}$ (d) $\frac{1}{x} = x^{-1}$

(e) $\frac{1}{27} = \frac{1}{3\times3\times3} = \frac{1}{(3)^3} = (3)^{-3}$

(f) $3^5 \div 3^8$ $(3)^{5-8} = (3)^{-3}$

(g) $5^2 \div 5^4$ $(5)^{2-4} = (5)^{-2}$

(h) $\frac{a^2 \times a^3}{a^6}$

$\frac{(a)^{2+3}}{a^6} = \frac{(a)^5}{a^6} = (a)^{5-6} = (a)^{-1}$

(i) $\frac{a^{-2}}{a^5} = a^{-2-5}$ $(a)^{-7}$

(j) $1 \div a = \frac{1}{a} = (a)^{-1}$

8. Express the following with positive exponents:

(a) $3^{-2} = \frac{1}{3^2}$ (b) $10^{-4} = \frac{1}{10^4}$

(c) $8^2 \div 8^6$ $(8)^{2-6} = (8)^{-4} = \frac{1}{8^4}$

(d) $(x^{-2})^4$ $(x)^{-8}$ $= \frac{1}{x^8}$

(e) $(8^{-2})^2$ $= (10)^{-4}$ $= \frac{1}{10^4}$

(f) $x^{-y} = \frac{1}{x^y}$ (g) $5^{-1} = \frac{1}{5}$

(h) $(pq)^{-2} = \frac{1}{(pq)^2}$

(i) $\left(\frac{3}{5}\right)^{-3} = \left(\frac{5}{3}\right)^{3}$

(j) $\left(\frac{x}{y}\right)^{-5} = \left(\frac{y}{x}\right)^{5}$

9. Simplify the following:

(a) $(4^{20} \div 4^{15}) \times 4^{10}$

$(4)^{20-15} \times (4)^{10}$

$(4)^5 \times (4)^{10}$

$(4)^{5-10}$ $(4)^{-5} = \frac{1}{4^5}$

$= \frac{1}{4\times4\times4\times4\times4} = \frac{1}{1024}$

(b) $(8^0 - 9^0) \times 5^0$

$(1-1)\times1$ $0\times1 = 0$

(c) $(10^{-2})^2$

$(10)^{-2\times2} = (10)^{-4}$

$\frac{1}{10^4} = \frac{1}{10\times10\times10\times10} = \frac{1}{10000}$

(d) $\{(4^2)^3 \times 2^5\} \times 2^8$

$\{4^{2\times3} \times 2^5\} \times (2)^8$

$\{4^6 \times 2^5\} \times (2)^8$

$\{(2^2)^6 \times 2^5\} \times (2)^8$

$\{(2)^{12} \times (2)^5\} \times (2)^8$

$(2)^{12+5+8}$ $(2)^{25}$

(e) $\frac{12^5 \times 9^5 \times 4}{6^4 \times 8^3 \times 27}$

$= \frac{(3\times4)^5 \times (3^2)^3 \times (2)^2}{(3\times2)^4 \times (2^3)^3 \times (3)^3}$

$= \frac{(3)^5 \times (4)^5 \times (3)^8 \times (2)^2}{(3)^4 \times (2)^4 \times (2)^9 \times (3)^3}$

$= \frac{(3)^5 \times (2)^{10} \times (3)^8 \times (2)^2}{(3)^4 \times (2)^4 \times (2)^9 \times (3)^3}$

$= \frac{(3)^5 \times (3)^{-4} \times (3)^{-3} \times (3)^8}{(2)^4 \times (2)^9 \times (2)^{-10} \times (2)^{-2}}$

$= \frac{(3)^{5-4-3+8}}{(2)^{4+9-10-2}} = \frac{(3)^{13-7}}{(2)^{13-12}} = \frac{(3)^6}{(2)^1}$

$= (3)^6 \times (2)$

(f) $\frac{2^{100} \times 2^{200}}{2^{50} \times 2^{100}}$ $= \frac{(2)^{100+200}}{(2)^{50+100}}$

$= \frac{(2)^{300}}{(2)^{150}} = (2)^{300-150} = (2)^{150}$

10. Find the value of n

(a) $(5^2)^n = (5^4)^3$

$(5^2)^n = (5)^{12} = 2n = 12$

$= n\frac{12}{2}6 = n = 6$

(b) $6^5 \times 6^n = 6^8$

$(6)^{5+n} = (6)^8 = 5 + n = 8$

$n = 8 - 5 \qquad n = 3$

(c) $(8^5)^n = 1 \qquad 8^{2n} = 1$

(d) $5^{n-2} \times 5^{2n-3} = 125$

$5^{n-2} \times 5^{2n-3} = (5)^3$

$5^{n-2+2n-3} = (5)^3$

$5^{3n-5} = (5)^3$

$3n - 5 = 3 \qquad = 3n = 3 + 5$

$3n = 8 \quad n = \frac{8}{3}$

(e) $\left(\frac{6}{7}\right)^5 \times \left(\frac{6}{7}\right)^4 = \left(\frac{6}{7}\right)^{2n+1}$

$\left(\frac{6}{7}\right)^{5+4} = \left(\frac{6}{7}\right)^{2n+1}$

$\left(\frac{6}{7}\right)^9 = \left(\frac{6}{7}\right)^{2n+1}$

$9 = 2n + 1 \qquad 2n = 9 - 1$

$2n = 8 \quad n = 4$

(f) $16 \times 2^{n+2} = 64$

$(2)^4 \times (2)^{n+2} = 64$

$2^{4+n+2} = (2)^6$

$6 + n = 6$

$n = 6 - 6 \qquad n = 0$

Exercise - 13.3

1. Write the following in standard form:

(a) 927635400000

9276354×10^6

$9.276354 \times 10^{6+6}$

9.276354×10^{12}

(b) $6250000000 = 625 \times 10^7$

$6.25 \times 10^{7+2} = 6.25 \times 10^9$

(c) $321000000000 = 321 \times 10^9$

$3.21 \times 10^{9+2} = 3.21 \times 10^{11}$

(d) $625.78 = \frac{625.78}{100}$

62578×10^{-2}

$6.2578 \times 10^{-2+4} = 6.2578 \times 10^2$

(e) 92135.6000

$\frac{92135.6000}{10000} = \frac{921356 \times 10^3}{10^4}$

$= 921356 \times 10^{3-4}$

$= 921356 \times 10^{-1}$

$= 9.21356 \times 10^{-1+5}$

$= 9.21356 \times 10^4$

(f) 0.6875000000

$\frac{0.6875000000}{10000000000}$

$= 6875000000 \times 10^{-10}$

$= 6875 \times 10^6 \times 10^{-10}$

$= 6875 \times 10^{6-10}$

$= 6875 \times 10^{-4}$

$= 6.875 \times 10^{-4+3} = 6.875 \times 10^{-1}$

2. Write the following in scientific mutation:

(a) $6521.07 \times 10^3 = \frac{6521.27}{100} \times 10^3$

$= 652107 \times 10^3 \times 10^{-2}$

$= 652107 \times 10^1 = 6521070$

(b) $\frac{0.321}{1000} \times 10^6 = 321 \times 10^6 \times 10^{-3}$

$= 321 \times 10^{6-3}$

$= 321 \times 10^3 = 321000$

(c) $\frac{92165.32}{100} \times 10^8$

$= 9216532 \times 10^{8-2}$

$= 9216532 \times 10^6$

$= 9216532000000$

(d) 0.000321×10^8

$= \frac{0.000321}{1000000} \times 10^8$

$= 321 \times 10^8 \times 10^{-6} = 321 \times 10^{8-6}$

$= 321 \times 10^2 = 32100$

(e) 8256×10^{10}

$= 82560000000000$

(f) $0.02154 \times 10^7 = \frac{0.02154}{100000} \times 10^7$

$= 2154 \times 10^{7-5}$

$= 2154 \times 10^2 = 215400$

3. **Write the following in expanded form:**

(a) $3\times10^7+2\times10^6+1\times10^5+5\times10^4+0\times10^2+2\times10^1+1\times10^0$

(b) $6\times10^7+0+0+5\times10^4+4\times10^3+3\times10^2+2\times10^1+1$

(c) $9\times10^8+8\times10^7+7\times10^6+6\times10^5+5\times10^4+4\times10^3+3\times10^2+2\times10^1+1\times10^0$

(d) $2\times10^7+0+1\times10^5+0+5\times10^3+0+6\times10^1+0$

(e) $9\times10^6+3\times10^5+2\times10^4+0+7\times10^2+2\times10^1+1\times10^0$

(f) $1\times10^{11}+9\times10^{10}+0+2\times10^8+8\times10^7+0+3\times10^5+7\times10^4+0+4\times10^2+6\times10^1+0$

4. **Write the following in short form:**

(a) 98765437 (b) 607403245
(c) 4462156 (d) 10574510

5. **Write the following in simple form:**

(a) 5632000 (b) 3812100
(c) 731200 (d) 65432
(e) 3756000000
(f) 12345000000

M.C.Q

1. (c), **2.** (b), **3.** (b), **4.** (c), **5.** (b)

Fill in the blanks:

1. 7.8 **2.** add **3.** Subtract **4.** 1 **5.** 0

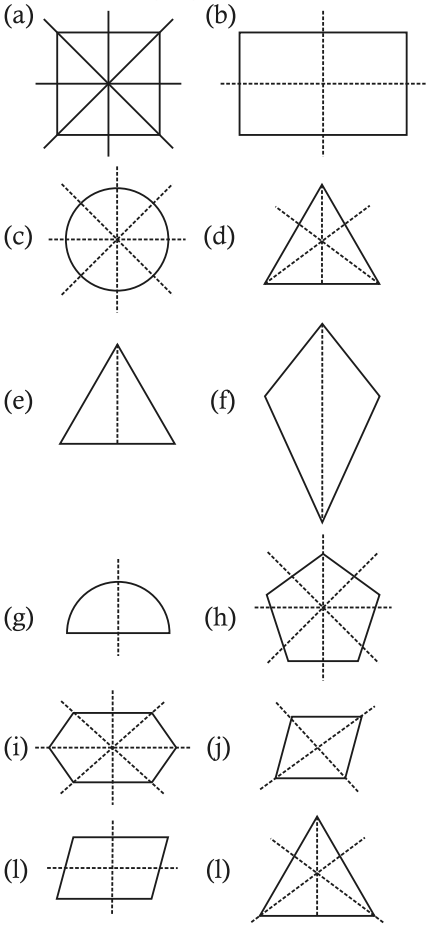
True and False

1. True **2.** False **3.** True **4.** True **5.** True

Chapter - 14

Exercise - 14.1

1. A, B ,C, D, E , M, T, U, V, W
2. H, I, O, X
3. (a) 2 (b) No (c) No (d) 1 (e) 4 (f) 2 (g) 1 (h) 4 (i) 5 (j) 6 (k) 8 (l) 7
4. (a) Diameter (b) Median (c) Perpendicular bisector of base
5. **draw the line of symmetry of the following figures:**



Exercise 14.2

1. (a) 90° (b) 90° (c) 90° (d) 180° (e) 360° (f) 90°

M.C.Q

1. (d), **2.** (a), **3.** (b), **4.** (d)

Fill in the blanks:

1. Line of symmetry
2. Point of rotation
3. Scalene
4. Infinite