



CLASS : 7 MATHEMATICS

CLASS : 7 1 st MID TERM PORTIONS AND PATTERNS		
INTERGERS	FRACTIONS AND DECIMALS (Exercise 2.1 and 2.2)	PRACTICAL GEOMETRY (Perpendicular Bisector)
I. Choose the correct answer		10 x 1 = 10
II. Do as directed		10 x 2 = 20
III. Answer the following		2 x 5 = 10
IV. Geometry / graph		1 x 10 = 10
		Total 50 marks

CLASS : 7 2 nd MID TERM PORTIONS AND PATTERNS	
LINES AND ANGLES	TRIANGLES, PROPERTIES AND CONGRUENCE (Exercise 5.1 and 5.2)
I. Choose the correct answer	10 x 1 = 10
II. Match the following	5 x 1 = 5
III. Do as directed	10 x 2 = 20
IV. Do as directed	3 x 5 = 15
Total 50 marks	

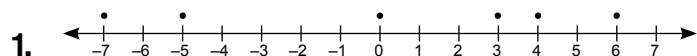
CLASS : 7 3 rd MID TERM PORTIONS AND PATTERNS	
PERCENTAGES AND MODELING SIMPLE INTEREST	STATISTICS
I. Fill in the blanks	5 x 1 = 5
II. Choose the correct answer	5 x 1 = 5
III. Match the following	5 x 1 = 5
IV. True or False	5 x 1 = 5
V. Answer the following (2 marks)	5 x 1 = 10
VI. Answer the following (5 marks)	4 x 5 = 20
Total 50 marks	



Class: 7 KEY ANSWERS

Chapter - 1 INTEGERS

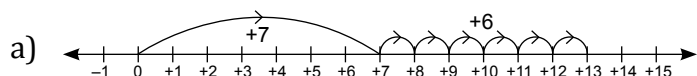
Exercise: 1.1



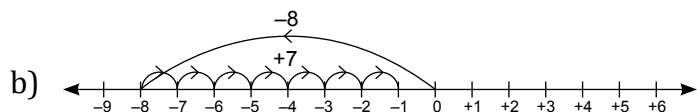
2. a) $+2 > 0$ b) $+5 > -5$ c) $-2 > -3$
 d) $+2 < +3$ e) $0 > -1$ f) $-1 < 0$
 g) $-7 < +7$ h) $-6 > -9$

Exercise: 1.2

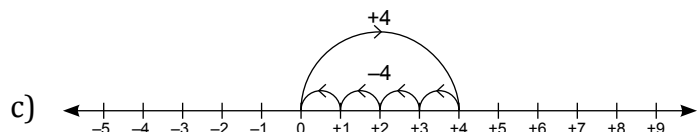
1.



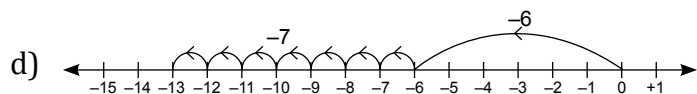
$$(+7) + (+6) = 13$$



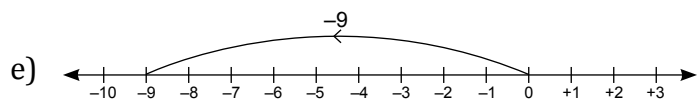
$$(-8) + (+7) = -1$$



$$(+4) + (-4) = 0$$



$$(-6) + (-7) = -13$$



$$(-9) + 0 = -9$$

2. a) 11 b) -13 c) -16 d) -9 e) -123

3. a) $-8 < -5 < -3 < 0 < +6$
 b) $-11 < -9 < -1 < +7 < +8$
 c) $-8 < -6 < 0 < +6 < +8$
 d) $-87 < -26 < -3 < +5 < +79$
 e) $-13 < -2 < 0 < +1 < +21$

4. a) $(-5) + (+15) = 10^\circ\text{C}$

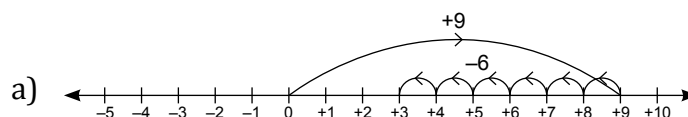
b) $(+8) + (+7) = 15^\circ\text{C}$

c) $(+8) + (-10) = -2^\circ\text{C}$

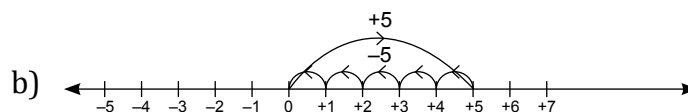
5. $(-2) + (+22) = 20^{\text{th}} \text{ floor}$

Exercise: 1.3

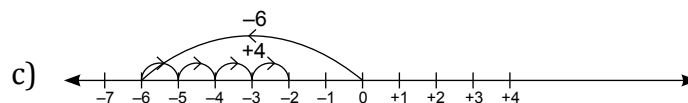
1.



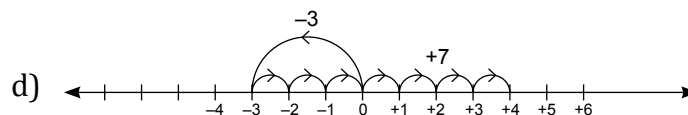
$$(+9) + (-6) = 3$$



$$+5 + (-5) = 0$$



$$(-6) + (+4) = -2$$



$$(-3) + (+7) = +4$$



$$(+4) + (+7) = +11$$

2. $306 + 550 - 408 = 448$

$$\begin{array}{r} 306 \\ + 550 \\ \hline 856 \end{array} \quad \begin{array}{r} 856 \\ - 408 \\ \hline 448 \end{array}$$

3. $9 - 3 = 6$ meters (height of ledge from ground)

4. $7200 - 8540 = -1340$ meters (minus sign indicates depth since '0' in the ground level)

Exercise: 1.4

- 224
 - +133
 - +700
 - 270
 - +120
- +157520
 - 132500
 - 218800
 - 64464
 - +25530
- $321 \times (1000 + 3) = 32100 + 963 = 321963$
 - $(1000 - 3) \times 83 = 83000 - 249 = 82751$
 - $(100 - 1) \times 63 = 6300 - 63 = 6237$
 - $(1000 - 2) \times (100 + 2) = 100000 + 2000 - 200 - 4 = 101796$
 - $81 \times (1000 + 1) = 81000 + 81 = 81081$

Exercise: 1.5

- Points sania gained in first round = +35

Points sania loses in second round = -44

Points sania gained in third round = +30

Final score = +35 - 44 + 30 = 21 points.
- 8
 - +1
 - 9
 - +5
- Rate at which submarine descends = 60 feet/minute. Time taken to descend 660 feet = $\frac{660}{60} = 11$ minutes.
- Rent of room per month = ₹500. Share that each person should pay = $\frac{500}{4} = ₹125$.
- Negative marks for wrong answers = 2 marks.

Positive marks for correct answers = 4 marks.

Total marks neerav gets for 15 correct and 4 wrong.

Answers = $(15 \times 4) - (5 \times 2)$

$= 60 - 10 = 50$ marks

Total mark Rajan gets for 14 correct answers.

$= 14 \times 4 = 56$ marks

Rajan got more marks in $(56 - 50) = 6$ marks more than Neerav.
- Cost of each torch = ₹55.50 paise.

Cost of 48 torches = 48×55.50

$= (50 - 2) \times (55 + 0.50)$

$= 2750 + 25 - 110 - 1$

$= ₹2664$.

$$\begin{aligned}
 7. \quad & (-8) \times (+9) + (-11) \times (-6) \\
 & = (-72) + (66) \\
 & = -6
 \end{aligned}$$

8.

+	0	+1	+2	+3	+4
-5	-5	-4	-3	-2	-1
-4	-4	-3	-2	-1	0
-3	-3	-2	-1	0	+1
-2	-2	-1	0	+1	+2

Chapter - 2 FRACTIONS AND DECIMALS

Exercise: 2.1

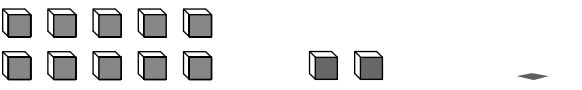
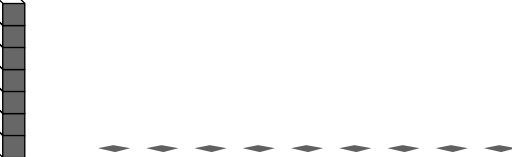
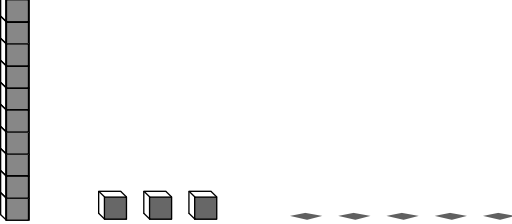
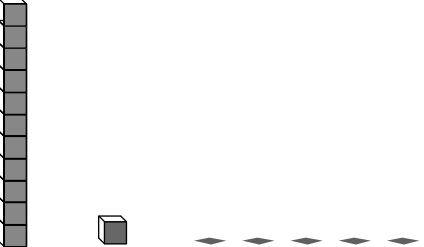
- $\frac{3}{6} = \frac{1}{2} = 0.5$
 - $\frac{7}{10} = 0.7$
 - $\frac{2}{5} = 0.4$
 - $\frac{4}{10} = 0.4$
 - $\frac{7}{14} = \frac{1}{2} = 0.5$
 - $\frac{6}{20} = \frac{3}{10} = 0.3$

2.

S.No	Fraction	Decimal Form
i)	$\frac{4}{5}$	0.8
ii)	$\frac{6}{10}$	0.6
iii)	$\frac{8}{16}$	0.5
iv)	$\frac{9}{10}$	0.9
v)	$\frac{6}{30}$	0.2

S.No	Decimal Form	Fraction
i)	0.4	$\frac{4}{10} = \frac{2}{5}$
ii)	0.1	$\frac{1}{10}$
iii)	0.7	$\frac{7}{10}$
iv)	0.3	$\frac{3}{10}$
v)	0.2	$\frac{2}{10} = \frac{1}{5}$

Exercise: 2.2

1. a)  3 ones 7 tenths
- b)  5 tenths
- c)  8 ones 4 tenths
- d)  2 ones 6 tenths
- e)  1 tens 2 ones 1 tenths
2. a)  0.2 = 2 tenths
- b)  4.3 = 4 ones 3 tenths
- c)  7.9 = 7 ones 9 tenths
- d)  13.5 = 1 tens 3 ones 5 tenths
- e)  11.6 = 1 tens 1 ones 6 tenths

//Note to teacher: Correction in page 20, example
The above expression can also be expressed in terms of powers of ten as follows:

$$524.75 = 5 \times 10^2 + 2 \times 10^1 + 4 \times 10^0 + 7 \times 10^{(-1)} + 5 \times 10^{(-2)}.$$

Exercise: 2.3

1. a) $69.85 = 60 + 9 + \frac{8}{10} + \frac{5}{100} = 6 \times 10 + 9 \times 1 + 8 \times \frac{1}{10} + 5 \times \frac{1}{100}$

Place value					
69.85	Hundreds	Tens	Ones	Tenths	Hundredths
	0	6	9	8	5

b) $314.57 = 300 + 10 + 4 + \frac{5}{10} + \frac{7}{100} = 3 \times 100 + 1 \times 10 + 4 \times 1 + 5 \times \frac{1}{10} + 7 \times \frac{1}{100}$

Place value					
314.57	Hundreds	Tens	Ones	Tenths	Hundredths
	3	1	4	5	7

c) $291.43 = 200 + 90 + 1 + \frac{4}{10} + \frac{3}{100} = 2 \times 100 + 9 \times 10 + 1 \times 1 + 4 \times \frac{1}{10} + 3 \times \frac{1}{100}$

Place value					
291.43	Hundreds	Tens	Ones	Tenths	Hundredths
	2	9	4	1	3

d) $721.06 = 700 + 20 + 1 + \frac{6}{100} = 7 \times 100 + 2 \times 10 + 1 \times 1 + 0 \times \frac{1}{10} + 6 \times \frac{1}{100}$

Place value					
721.06	Hundreds	Tens	Ones	Tenths	Hundredths
	7	2	1	0	6

e) $801.24 = 800 + 1 + \frac{2}{10} + \frac{4}{100} = 8 \times 100 + 0 \times 10 + 1 \times 1 + 2 \times \frac{1}{10} + 4 \times \frac{1}{100}$

Place value					
801.24	Hundreds	Tens	Ones	Tenths	Hundredths
	8	0	1	2	4

2.

S.No.	Measurements	In metre	In Decimal Form
1.	5 m 74 cm	5 and 74 hundredths of a metre	5.74
2.	2 m 91 cm	2 and 91 hundredths of a metre	2.91
3.	38 m 62 cm	38 and 62 hundredths of a metre	38.62
4.	86 cm	86 hundredths of a metre	0.86
5.	49 m 30 cm	49 and 3 tenths of a metre (or) 30 hundredths of a metre	49.3 (or) 49.30
6.	157m 9 cm	157 and 9 hundredths of a metre	157.09

3. a)

Place value					
41.92	Hundreds	Tens	Ones	Tenths	Hundredths
	0	4	1	<u>9</u>	2

b)

Place value					
235.08	Hundreds	Tens	Ones	Tenths	Hundredths
	2	3	5	0	<u>8</u>

c)

Place value					
0.75	Hundreds	Tens	Ones	Tenths	Hundredths
	0	0	0	<u>7</u>	5

d)

Place value					
60.61	Hundreds	Tens	Ones	Tenths	Hundredths
	0	6	0	<u>6</u>	1

e)

Place value						
310.341	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
	3	1	0	3	<u>4</u>	1

4. a) 0.65 m b) 0.09 m c) 13.17 m
d) 17.03 m e) 10.01 m

//Note to teacher: Correction in example (2) pg. 23

$$34.056 = 30 + 4 + \frac{0}{10} + \frac{5}{100} + \frac{6}{1000}$$

$$34.506 = 30 + 4 + \frac{5}{10} + \frac{0}{100} + \frac{6}{1000} //$$

Exercise: 2.4

1. a) 43.5 b) 112.3 c) 101.2
2. a) 0.4 cm b) 9.8 cm c) 7.5 cm
d) 61.2 cm e) 3 cm f) 12.3 cm
g) 91 cm h) 5.6 cm i) 0.7 cm
j) 11.1 cm
3. a) 0.32 m b) 0.08 m c) 0.87 m
d) 9.04 m e) 3.57 m f) 0.05 m
g) 14.66 m h) 29.02 m i) 6.54 m
j) 1.1 cm

4. a) $56.4 = 50 + 6 + \frac{4}{10}$

b) $391.17 = 300 + 90 + 1 + \frac{1}{10} + \frac{7}{100}$

c) $815.5 = 800 + 10 + 5 + \frac{5}{10}$

d) $204.973 = 200 + 4 + \frac{9}{10} + \frac{7}{100} + \frac{3}{1000}$

e) $1357.852 = 1000 + 300 + 50 + 7 + \frac{8}{10} + \frac{5}{100} + \frac{2}{1000}$

f) $99.909 = 90 + 9 + \frac{9}{10} + \frac{0}{100} + \frac{9}{1000}$

g) $101.1 = 100 + 1 + \frac{1}{10}$

h) $228.82 = 200 + 20 + 8 + \frac{8}{10} + \frac{2}{100}$

i) $70.03 = 70 + \frac{3}{100}$

j) $41.7 = 40 + 1 + \frac{7}{10}$

5. a)

Tens	Ones	Tenths	Hundredths
1	6	<u>4</u>	5

b)

Tens	Ones	Tenths	Hundredths
9	7	3	<u>2</u>

c)

Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
6	5	4	<u>7</u>	1	8

d)

Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
2	0	2	2	0	<u>9</u>

e)

Ones	Tenths	Hundredths	Thousandths
8	9	<u>3</u>	8

f)

Thousands	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
6	1	7	8	8	3	<u>5</u>

6. i) (d) ii) (b) iii) (c)
iv) (a) v) (b)

Exercise: 2.5

1. a) 0.051 b) 0.112 c) 0.48
d) 75.6 e) 0.04 f) 0.14
g) 0.005 h) 0.06 i) 0.75
j) 0.05

2. a) $\frac{536479}{1000}$ b) $\frac{211543}{500}$

- c) //Note to teacher: Correction in the question: 2 thousands + 3 hundreds + 7 tens + 2 ones + 4 hundredths = $\frac{59301}{25}$ //

3. a) $\frac{8}{1000} = \frac{1}{125}$

b) $\frac{2}{10000} = \frac{1}{5000}$

c) $\frac{948}{100} = \frac{237}{25}$

Exercise: 2.6

1. a)

Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
9	8	5	0	0	3

- b)

Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
0	1	8	5	6	0

- c)

Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
1	0	5	1	9	4

- d)

Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
0	0	0	0	8	7

- e)

Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
0	1	0	1	0	1

2. a) 43.247 b) 9.108 c) 50.006
d) 236.09 e) 0.135 f) 7.004
g) 4.091

3. Fill in the table below:

S.No.	Decimal Form	Hundreds (100)	Tens (10)	Ones (1)	Tenths $\frac{1}{10}$	Hundredths $\frac{1}{100}$	Thousandths $\frac{1}{1000}$
1.	607.981	6	0	7	9	8	1
2.	720.304	7	2	0	3	0	4
3.	100.001	1	0	0	0	0	1
4.	5.09	0	0	5	0	9	0
5.	111.1	1	1	1	1	0	0
6.	506.798	5	0	6	7	9	8
7.	821.043	8	2	1	0	4	3
8.	42.605	0	4	2	6	0	5
9.	304.007	3	0	4	0	0	7
10.	660.66	6	6	0	6	6	0
11.	123.9	1	2	3	9	0	0
12.	78.03	0	7	8	0	3	0

4. a) 0.6 b) 7.5 c) 3.5
 d) 4.6 e) 0.8 f) 0.55
 g) 0.84 h) 9.64 i) 8.005
 j) 10.06 k) 25.25 l) 17.05
 m) 34.75 n) 11.26 o) 12.068

5. a) $\frac{3}{5}$ b) $\frac{16}{5}$ c) $\frac{17}{5}$
 d) $\frac{3}{4}$ e) $\frac{3}{10}$ f) $\frac{7}{20}$
 g) $\frac{29}{20}$ h) $\frac{6}{25}$ i) $\frac{41}{4}$
 j) $\frac{9}{100}$ k) $\frac{213}{50}$ l) $\frac{79}{25}$

Exercise: 2.7

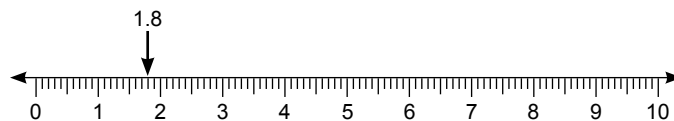
1. a) 7.02 b) 24.79 c) 6.14
 d) 0.97 e) 4.03 f) 0.999
 g) 0.001 h) 0.08
2. a) 513.21 b) 0.05 c) 6.494
 d) 1.95 e) 7.83 f) 0.191
 g) 0.191 h) 23.8
3. a) 2.68, 2.86, 6.28, 6.82, 8.26, 8.62
 b) 417.29, 472.1, 472.19, 472.9, 472.91, 479.12, 479.21
4. a) 53.27, 35.72, 35.7, 35.27, 32.75, 32.5, 32.05, 27.53, 23.57
 b) 851.34, 851.3, 815.43, 815.34, 581.3, 518.43, 518.04, 185.3, 158.43
5. a) $54.31 > 54.3$ b) $0.006 = 0.00600$
 c) $75.5 = 75.50$ d) $10.01 < 10.1$
 e) $212.01 > 212.001$

Exercise: 2.8

1. a)



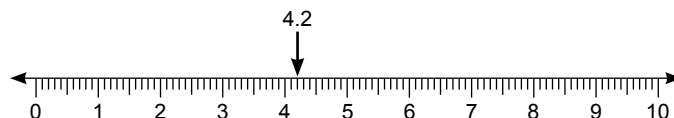
- b)



- c)



- d)



- e)



2. Sample answers: 4.1, 4.2,4.8, 4.9

3. Sample answers: 5.1, 5.2,5.8, 5.9

4. i) (a) & (b) ii) (d)

5. a) 0.8 lies between 0 and 1.
 b) 9.9 lies between 9 and 10.
 c) 4.3 lies between 4 and 5.
 d) 1.6 lies between 1 and 2.
 e) 7.5 lies between 7 and 8.
 f) 3.4 lies between 3 and 4.

6. Point A represents 2.7, Point B represents 5.9,
 Point C represents 8.3, Point D represents 3.1.

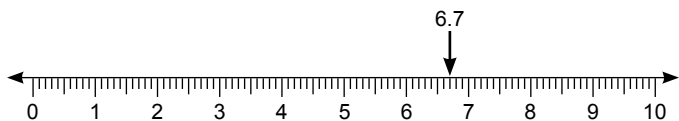
7. a)



- b)



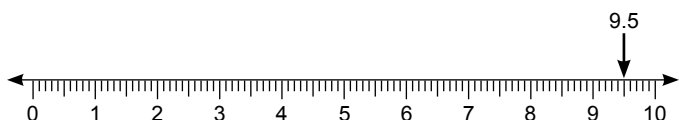
(c)



d)



e)



8. a)

Place value					
581.69	Hundreds	Tens	Ones	Tenths	Hundredths
	5	8	1	6	9

b)

Place value						
380.702	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
	3	8	0	7	0	2

9. a) 90.207 b) 605.48

10. a) Seven point Five Two Eight

b) Four Hundred Sixteen point Zero/Four Hundred Sixteen

c) Zero point Three/Point Three 0.3

d) Sixty Nine point Four One

11. a) 0.9 b) 0.8 c) 0.35

d) 0.0078 e) 1.4 f) 1.65

g) 0.032 h) 0.02

12. a) 0.201 b) 0.98

13. School B

14. a) $\frac{15}{2}$ b) $\frac{256}{5}$ c) $\frac{68709}{1000}$

d) $\frac{1}{4}$ e) $\frac{19}{8}$ f) $\frac{3}{2000}$

g) $\frac{1}{5000}$ h) $\frac{1}{2000}$

15. a) 0.578 kg b) 8.013 kg c) 0.042 kg

d) 9.31 kg e) 12.345 kg

16. a) 0.24 m b) 7.09 m c) 11 m

d) 67.7 m e) 31.85 m

17. a) 7.003 m b) 0.073 m c) 0.703 m

d) 0.007 m e) 3.07 m

18. a) 0.03 km b) 0.415 km c) 6 km

d) 0.005 km e) 4.189 km

19. a) ₹358.60 b) ₹385.95 c) 7.6 m

d) 1.05 m e) 43.7 km f) 10.06 km

g) 30.005 km h) 3.504 km

20. a) 0.3 g b) 0.94 m c) 1.25 lit

21. Men: 0.64, Women : 0.36

22. Red Balloons: 0.4, Blue Balloons: 0.6

23. a) 0.3 lies between 0 and 1

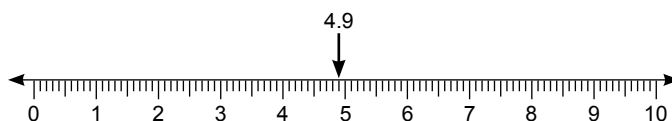
b) 6.9 lies between 6 and 7

c) 5.7 lies between 5 and 6

d) 1.2 lies between 1 and 2

24.

a)



b)



25. Point J represents 5.5, Point K represents 3.5, Point L represents 7.6, Point M represents 0.2, Point N represents 9.9

Exercise: 2.9

1. a) 8 b) 25 c) 81
d) 189 e) 1051
2. a) 18.4 b) 42.4 c) 62.8
d) 986.1 e) 59.6
3. a) 15.87 b) 73.41 c) 90.93
d) 185.05 e) 84.57
4. a) 0.391 b) 1.408 c) 22.996
d) 09.050 e) 36.564
5. a) 62.98 b) 567.0 c) 39.470

Exercise: 2.10

1. a) ₹79 b) 1890.296 c) 10.279
d) 13.987 kg
2. a) 4.59 b) 685.96 c) 34.505
d) 775.13 e) 236.91
3. a)

0.7	1.49	1.06
2.15	0.46	0.64
0.4	1.3	1.55

b)

6.9	-	-	-
3.3	3.6	-	-
1.8	1.5	2.1	-
0.5	1.3	0.2	1.9

4. a) 21.9°C b) 1.169 km
5. ₹169.75
6. 11 km 395 m or 11.395 km

7. 18.95 m

8. 46 g

9. 0.6 kg

10. ₹92.25

Multiple choice questions:

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

Exercise: 2.11

1. a) 110 b) 4 c) 6.05 d) 7
e) 2 f) 6 g) 0.9 h) 0.2
i) 0.07 j) 8
2. a) 3.655 b) 505.025 c) 52.392 d) 27.08
e) 0.324 f) 0.034 g) 101.102 h) 0.35
i) 4272.18 j) 0.6 k) 6.09 l) 0.56
3. 23.61
4. 25.5 kg
5. a) 1124.5 b) 11245 c) 224.9 d) 1012.05
6. ₹45.20
7. no, 7 rolls, 8.32 meter
8. 123.5 km
9. 26.4
10. 18 pairs weight = 2747.7 mg and 1252.3 g of gold will left over.

Multiple choice question:

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

Exercise: 2.12

1. a) 10 b) 0.0008625 c) 100
d) 1.14 e) 48.95 f) 1000
g) 10000 h) 3526 i) 10000
j) 0.0474
2. a) 77.15 b) 0.8907 c) 0.0000913
d) 0.264 e) 0.00156 f) 64.86
g) 0.0545 h) 0.0307 i) 0.0000068
j) 0.7408

3. a) 9.02 b) 1.37 c) 0.14
 d) 0.3 e) 0.05 f) 0.91
 g) 15.9 h) 195.4
4. a) 22.4 b) 2 c) 37 d) 31
 e) 2.9 f) 0.156
5. a) 0.73 b) 0.67 c) 112.15
6. a) 1.691 b) 3.156 c) 0.243
7. 9
8. 35 km
9. ₹117.5
10. 60.15
11. 20.386
12. 38

Multiple choice questions:

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

H.O.T.S:

1. 1st line - 0.01
 2nd line - 0.2
 3rd line - 3, 0.02

Chapter - 3 ALGEBRA

Exercise: 3.1

1.

#	coefficient of x	constant term
(a)	2	-7
(b)	14	-11
(c)	-7	-3
(d)	2	0

2.

#	Type of polynomial	Degree
(a)	M	3
(b)	M	1

(c)	M	3
(d)	M	3
(e)	M	2
(f)	B	2
(g)	B	2
(h)	B	2
(i)	T	3
(j)	B	3

Where

M - Monomial

B - Binomial

T - Trinomial

Exercise: 3.2

- I. 1. 27 2. -11784 3. -4092
 4. 10 5. 10

- II. a. $a = 2, b = 1$

1.	$a^2 + b^2 + 2ab = 4 + 1 + 4 = 9$	$(a + b)^2 = (2 + 1)^2 = 9$
2.	$a^2 - 2ab + b^2 = 4 - 4 + 1 = 1$	$(a - b)^2 = (2 - 1)^2 = 1$
3.	$(a + b)(a - b) = 3 \times 1 = 3$	$a^2 - b^2 = 4 - 1 = 3$
4.	$a^3 - b^3 = 23 - 13 = 10$	$(a - b)(a^2 + ab + b^2) = (1)(4 + 2 + 1) = 7$
5.	$A3 + b^3 = 23 + 13 = 36$	$(a + b)(a^2 - ab + b^2) = (3)(4 - 1 + 1) = 9$

- b. $a = 11, b = 18$

	LHS	RHS
1.	$a^2 + b^2 + 2ab = 121 + 64 - 176 = 9$	$(a + b)^2 = 32 = 9$
2.	$a^2 - 2ab + b^2 = 121 + 176 + 64 = 361$	$(a - b)^2 = 192 = 361$
3.	$(a + b)(a - b) = 3 \times 19 = 57$	$a^2 - b^2 = 121 - 64 = 57$
4.	$a^3 - b^3 = 1331 - 512 = 819$	$(a - b)(a^2 + ab + b^2) = 19 \times (121 - 88 + 64) = 1843$
5.	$a^3 + b^3 = 1331 + 512 = 1843$	$(a + b)(a^2 - ab + b^2) = 3 \times (121 + 88 + 64) = 819$

- III. 1. area = $l \times b = 4 \times 3 = 12 \text{ cm}^2$
 Perimeter = $2(l + b) = 2(4 + 3) = 14 \text{ cm}$
 2. area = $l \times b = 12 \times 7 = 84 \text{ cm}^2$
 Perimeter = $2(l + b) = 2(12 + 7) = 38 \text{ cm}$

IV.

#	Dimensions	Volume = $l \times b \times h$	Surface area = $2(lb + bh + hl)$
1.	$l = 5 \text{ cm},$ $b = 4 \text{ cm},$ $h = 3 \text{ cm}$	$5 \times 4 \times 3 = 60 \text{ cm}^3$	$2(5 \times 4 + 4 \times 3 + 3 \times 5) = 2(20 + 12 + 15) = 94 \text{ cm}^2$
2.	$l = 15 \text{ cm},$ $b = 7 \text{ cm},$ $h = 2 \text{ cm}$	$15 \times 7 \times 2 = 210 \text{ cm}^3$	$2(15 \times 7 + 7 \times 2 + 2 \times 15) = 2(105 + 14 + 30) = 298 \text{ cm}^2$

- V. 1. 2 cubed = $2^3 = 2 \times 2 \times 2 = 8$
 3 squared = $3^2 = 3 \times 3 = 9$
 2. thrice 7 = $3 \times 7 = 21$
 7 cubed = $7^3 = 7 \times 7 \times 7 = 343$
 3. $5x = 5 \text{ times } x$
 $x^5 = x \times x \times x \times x \times x$
 If $x = 2$ then $5x = 10$ $x^5 = 25 = 32$
 4. Area = a^2 if $a = 16$ then Area = $16^2 = 256$

- VI. 1. a. 2×2 2. b. 5
 3. b. 1 4. b. 1
 5. c. 25 6. a. 75
 7. b. 1 8. b. -6
 9. a. 6 10. b. 5

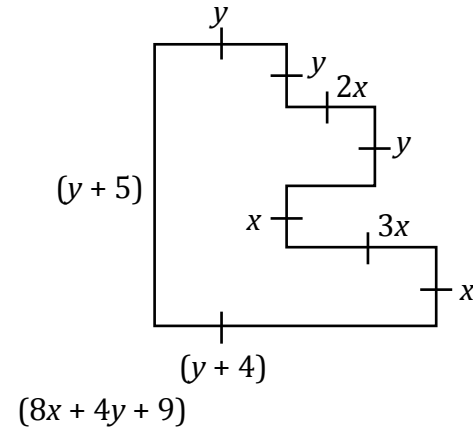
Exercise: 3.3

I. 1.

My age	My son's age
$2x$	x
5 years hence $(2x + 5)$	$(x + 5)$
4 years before $(2x - 4)$	$(x - 4)$

- II. 1) $2(x + 3)$
 2) $4x + 2y + 14$

- 3) Data missing $(8x + 4y + 9)$
 4) $2x + 4y + 6$
 5) $4(x + y)$



III.

#	Expression (simplified)	# of terms	Variables	Constants
1.	$4b - a$	2	a, b	-
2.	$-5a + 17c + 3$	3	a, c	3
3.	$a^2 - 14a - 10b + 15c$	4	a, b, c	-
4.	$7a - 5d$	2	a, d	-
5.	$xyz + 15$	2	x, y, z	15

- IV. 1. Let pens be 'x' and 'y' be pencil, expression = $11x + 5y$
 2. Perimeter of rectangle = $2(x + y + z) = 2x + 2y + 4$
 3. Let red ball be 'x' and green ball be 'y'
 Total number of balls = $4x + 5y$
 Two green balls removed
 Total number of balls = $4x + 3y$
 4. a. $6x^2 + 13xy^2$
 b. $-3a - 6b + 18$
 c. $-8x - 11y + 7$
 d. $9a^2b - 3ab^2 - 2ab$
 V. 2. $6a + b$ 5. $8x + 27y$
 3. $4x + 10y$ 6. $2xyz - 8$
 4. abc

- VI. 1. d. 0 3. a. $-2x, -3y$
 2. a. $2a, -3a$ 4. c. $4a$

Exercise: 3.4

- I. 1. $x = 3$ 2. $x = -1$ 3. $x = \frac{7}{2}$
 4. $x = 6$ 5. $x = 9$ 6. $z = 8$
 7. $x = 3$ 8. $a = -12$ 9. $x = 2$
 10. $y = \frac{-48}{5}$
- II. 1. $x = -2$ 2. $y = -5$ 3. $x = 30$
 4. $x = \frac{-3}{2}$ 5. $x = 7$
- III. 1. c. 10 2. a. 8 3. b. $(5x = -10)$
 4. d. none 5. b. $-x = 2$
- IV.
1. $(9x - 5) - (2x + 2) = 9x - 2x - 5 - 2 = 7x - 7 = 7(x - 1)$
 2. Let x be the number
 Given $\frac{x - 9}{2} = 4 \Rightarrow x - 9 = 8 \Rightarrow x = 17$
 3. Let the largest number be x
 $x + (x - 1) + (x - 2) = 72 \Rightarrow 3x - 3 = 72$
 $\Rightarrow x - 1 = 24$
 $\Rightarrow x = 25$
 Largest number is 25
 4. Let age of Aaron be x
 Then age of Rony is $x + 5$
 Four years later $2(x + 4) = x + 9$
 $\Rightarrow 2x + 8 = x + 9 \Rightarrow x = 1$
 Present age of aaron = 1 year
 Present age of Rony = $1 + 5 = 6$ years
 5. Let the number of boys be ' x ', then number of girls is $(x + 8)$
 Given condition $\frac{3}{5x} = \frac{1}{5}(x + 8)$
 $\therefore 2x = 8 \Rightarrow x = 4$
 No. of boys = $x = 4$ boys

No. of girls = $x = 12$ girls

Total students = $(12 + 4) = 16$ students

6. Let breath of rectangle be ' b ' then length $l = b + 5$, Perimeter of the rectangle
 $p = 2(l + b)$
 $= 2(b + 5 + b) = 4b + 10$
 Given $P = 50\text{cm} \Rightarrow 4b + 10 = 50 \Rightarrow 4b = 40$
 $\Rightarrow b = 10\text{cm}$
 Length of rectangle = $b + 5 = 15\text{cm}$
 Breath of rectangle = $b = 10\text{cm}$
7. Let side of square be ' a '
 Perimeter, $4a = 64$
 $\therefore a = 16\text{cm}$
 Side of square, $a = 16\text{cm}$
8. Let after ' x ' years father's age will be double that of son the
 $(40 + x) = (12 + x) \times 2 \Rightarrow 40 + x = 24 + 2x$
 $\Rightarrow x = 16$
 After 16 years fathers age will be 56 and son age will be 28, (half the age of father)
9. length = 7cm width = $(x - 8)$
 Area = $7 \times (x - 8) = 42\text{cm}^2 \Rightarrow x - 8 = 6 \Rightarrow x = 14$
10. Let the number be ' x '
 Condition: $\frac{3}{5}x = 4 + \frac{1}{2}x \Rightarrow (\frac{3}{5} - \frac{1}{2})x = 4$
 $(\frac{6 - 5}{10})x = 4 \Rightarrow x = 40$
 The number is 40
- H.O.T.S:**
1. Let Anand age be ' x ', then sister age is $x = 2$, father age is $x + 25$
 Given $x + (x + 2) + x + 25 = 53 \Rightarrow 3x + 27 = 53$
 $3x = 26 \Rightarrow x = \frac{26}{3}$
 Anand age is $\frac{26}{3}$ and Father's age is $\frac{101}{3}$
2. Let breadth of rectangle be ' b '
 Then length = $b + 3$
 Area of rectangle = $b(b + 3)$
 Length and breadth is increased by 2 cm

$$\therefore \text{New length} = b + 5$$

$$\text{Breadth} = b + 2$$

$$\text{New area} = (b + 5)(b + 2)$$

$$\text{New area} = \text{old area} + 70$$

$$\Rightarrow b^2 + 7b + 10 = b^2 + 3b + 70$$

$$\Rightarrow 4b = 60$$

$$\Rightarrow b = 15 \text{ cm}$$

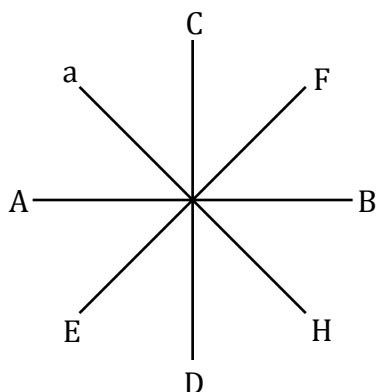
$$\therefore \text{length} = b + 3 = 18 \text{ cm}$$

$$\text{breadth} = b = 15 \text{ cm.}$$

Chapter - 4 LINES AND ANGLES

Exercise: 4.1

1. a. $\angle FOB$ and $\angle BOH$
b. $\angle AOD$ and $\angle BOD$



2. $\angle AOE$ and $\angle EOB$ and adjacent angles
They have common arm OE
3. a. 90 degree b. 180°
c. 90 degree d. 180°

Exercise: 4.2

1. $XY \perp YZ$
 $\therefore \angle XYO + \angle OYZ = 90^\circ$
 $\angle XYO + 25^\circ = 90^\circ$
 $\angle XYO = 65^\circ$
2. $\angle POA + \angle y + \angle x + \angle BOR = 180^\circ$
($\angle AOB = 180^\circ$)

$$\angle x + \angle y = 180 - 34 - 35 = 111^\circ$$

$$\angle x = 111^\circ - 51^\circ = 60^\circ$$

3. PQ is straight line

$$\text{Therefore } \angle QOY + \angle x + \angle POS = 180^\circ$$

$$\angle x = 170^\circ - 95^\circ - 60^\circ = 25^\circ$$

XY is also a straight line

$$\text{Therefore } \angle y = 60^\circ \text{ [Vertical opposite angles]}$$

$$OR \perp OP \quad \angle y + \angle z = 90^\circ$$

$$\angle z = 90^\circ - 60^\circ = 30^\circ$$

4. $\overleftrightarrow{CD}$ is a straight line

$$\text{ie. } \angle x + \angle EOB + \angle BOD = 180^\circ$$

$$\angle x = 180^\circ - 69^\circ - 55^\circ = 56^\circ$$

EF is a straight line

$$\text{ie. } \angle y + \angle BOD + \angle EPB = 180^\circ$$

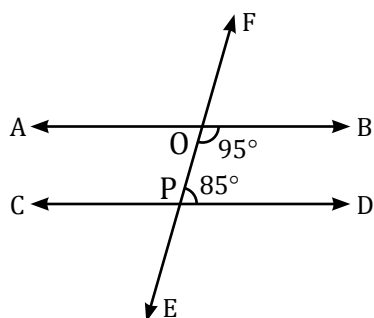
$$\angle y = 180 - 69 - 55 = 56$$

$$\angle x = \angle y$$

[vertical opposite angles are equal]

Exercise: 4.3

1. a. $\angle b = 180 - 105 = 75$ [Linear pairs]
 $\angle a = 75 = \angle b$ [Corresponding angles]
 $\angle d = 105$ [corresponding angles]
 $\angle c = 180 - 105$ [Linear pair]
- b. $\angle 1 = 180 - 90 = 90$ [Linear pair]
 $\angle 4 = \angle 1 = 90$ [corresponding angle]
 $\angle 2$ and $\angle 3$ cannot be found from the given information.
- c. $\angle c = 120$ [corresponding angles]
 $\angle a = 180 - 120$ [Linear pair]
 $\angle b = \angle a = 120$ [vertically opposite angles]
2. a. $\angle FOB = 180 - 95 = 85$ [Linear pair]
 $\angle FOB = \angle OPD = 85$
Therefore $\overleftrightarrow{BA}$ is $\parallel$ to $\overleftrightarrow{CD}$

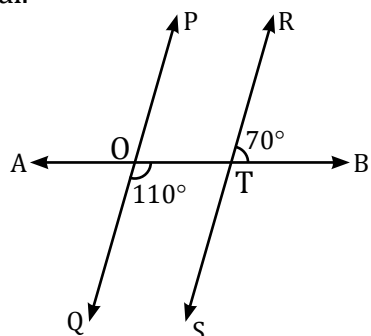


b. $\angle BTR = 70$

Therefore $\angle BTS = 180 - 70 = 110$ [Linear pair]

$\angle BTS = \angle TOQ = 110$

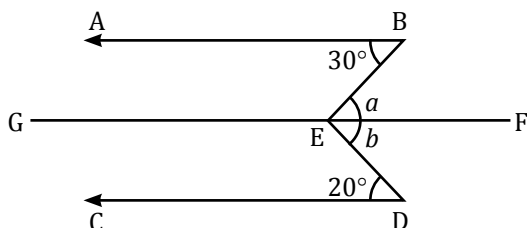
$\therefore \overleftrightarrow{PQ}$ and $\overleftrightarrow{RS}$ are $\parallel$ because corresponding angles are equal.



3. Draw a line AF $\parallel$ to AB and CD through E

Therefore $\angle a = 30$ $\angle b = 20$ - alternate interior angles are equal.

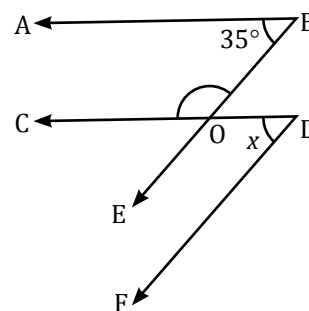
$\angle x = \angle a + \angle b = 30 + 20 = 50$



4. $\angle BOD = 35$ [AB $\parallel$ CD, $\angle BOD$ and $\angle OBA$ are alternate interior angles]

$\angle y = 180 - 35 = 145$ [Linear pair]

$\angle x = \angle BOD = 35$ [BE $\parallel$ DF, $\angle BOD$ and $\angle x$ are alternate interior angles]



5. $\angle x = 120^\circ$ [BC $\parallel$ EF, BCE and $\angle x$ are corresponding angles]

$\angle y = 120$ [AB $\parallel$ CD? - BCE and $\angle y$ are alternate interior angles]

6. Extend the edges of parallelogram as shown in figure.

$\angle EAB = 180^\circ - 108^\circ = 72^\circ$ [Linear pair]

$\angle x = \angle EAB = 72$ [AD $\parallel$ BC, $\angle EAB$ and $\angle x$ are alternate interior angles]

$\angle CBG = 108$ [AD $\parallel$ BC, $\angle CBG$ and $\angle DAB$ are corresponding angles.]

$\angle y = \angle CBG = 108$ [DC $\parallel$ AB, $\angle y$ and $\angle CBG$ are alternate interior angles.]

Opposite angles of a parallelogram are equal.

Chapter - 5 TRIANGLES, PROPERTIES AND CONGRUENCE

Try These (page 93):

1. Equilateral triangle

Isosceles obtuse triangle

Scalene acute triangle

Scalene obtuse triangle

Isosceles right triangle

Scalene right triangle

2. a) always true

b) never true

c) always true

d) never true

e) always true

f) always true

g) sometimes true

h) never true

3. $10 + 8 > x$, $8 + x > 10$, x lies between 2 and 18.

Try this (Page 97):

$\angle 2$ and $\angle 4$ are ext $\angle A$

$\angle 6$ and $\angle 8$ are ext $\angle B$

$\angle 10$ and $\angle 12$ are ext $\angle C$

Exercise: 5.1

1. a. 14° b. $64^\circ, 49^\circ, 67^\circ$
2. $\angle C = 90^\circ, \angle B = 54^\circ$
3. $x = 26^\circ, y = 33^\circ$
4. $45^\circ, 105^\circ, 30^\circ$
5. $\angle F = 52^\circ, \angle D = 76^\circ$
6. $\angle A = \angle B = 5^\circ, \angle C = 130^\circ$
7. $x = 30^\circ, y = 60^\circ$
8. $x = 70^\circ, y = 40^\circ, z = 50^\circ$
9. $x = 42^\circ, y = 84^\circ, z = 12^\circ$
10. $x = 135^\circ, y = 20^\circ$
11. 138°
12. $x = 38^\circ, \angle A = 26^\circ, \angle B = 66^\circ, \angle C = 88^\circ$
13. $a = 125^\circ, b = 75^\circ$
14. $x = 29$, the angle are $37^\circ, 53^\circ$
15. $x = y = 38^\circ$

Objective type questions:

1. b 2. d 3. a 4. d 5. c 6. c

Try This (Page 104)

Congruent Pairs

- 1 and 8, 2 and 14, 5 and 10,
6 and 11, 7 and 13, 12 and 15.
3, 4, 9 and 16 do not have a congruent pair.

Exercise: 5.2

1. a. $\triangle RST \cong \triangle CAB$, (SAS)
CPCT: $RS = CA, \angle R = \angle C, \angle S = \angle A$
b. $\triangle HTA \cong \triangle MPA$, (ASA)
CPCT: $TA = PA, HA = MA, \angle HAT = \angle MAP$
c. $\triangle ADC \cong \triangle ADB$, (SSS)
CPCT: $\angle ADC = \angle ADB, \angle DAC = \angle DAB, \angle ACD = \angle ABD$
d. $\triangle DEC \cong \triangle BFA$, (ASA)
CPCT: $DE = BF, EC = FA, \angle DEC = \angle BFA$
2. $x = 7$, SSS congruence condition
3. $x = 1, y = 8$
4. $PQ = XY, QR = YZ, PR = XZ, \angle P = \angle X, \angle Q = \angle Y, \angle R = \angle Z, QR = 6.4 \text{ cm}, XZ = 7.5 \text{ cm}, \angle Y = 100^\circ$
5. $\triangle ABC \cong \triangle DCB$ (SAS)
6. ASA congruence condition
CPCT: $RM = SM$, Yes PQ bisects RS .
7. 67
8. $x = 3, y = 6$
9. $\triangle ABC \cong \triangle CDE$ (RHS)
CPCT: $BC = DE, \angle BAC = \angle DCE, \angle ACB = \angle CED$
10. $\angle P = 50^\circ, \angle B = 80^\circ$

Constructions: To be done by Students

Miscellaneous problems:

1. $\angle APB = \angle CPD = 30^\circ$
 $\angle APB = \angle DPC = 30^\circ$
 $\angle CPD = \angle DPE = 30^\circ$
 $\angle APC = \angle BPD = 120^\circ$
 $\angle APD = \angle BPE = 150^\circ$
2. $x = 25$
3. $\triangle TSR, \triangle STP, \triangle TPQ, \triangle PQR$
4. $\triangle NPQ \cong \triangle MQR$, (SAS)
CPCT: $RM = QN$
5. 140°
6. $a = 120^\circ$ $b = 67^\circ$

7. $x = 35^\circ, y = 125^\circ$
8. $y = 31^\circ$
9. $\angle BCD = 72^\circ$
10. 50°
11. $x = 78^\circ, y = 24^\circ, z = 66^\circ$
12. ASA congruence condition
13. a) SSS congruence condition,
b) SAS congruence condition
14. (i) SSS congruence condition
(ii) Linear pairs of equal angles
(iii) SAS congruence condition
15. AAS congruence condition

Chapter - 6 MEASUREMENTS

Exercise: 6.1

1.		Radius	Diameter	Circumference
	a	1.4 cm	2.8cm	8.8 cm
	b	4.9 cm	9.8cm	30.8 cm
	c	3.15m	6.3 m	19.8 m
	d	21 m	42m	132 m
	e	0.7 cm	1.4 cm	4.4cm

2. 968 m
3. a) 1.32m, b) 396m
4. a) $r = 14$ cm, Cir = 88cm
b) $r = 3.5$ cm, Cir = 22 cm
5. 44 cm
6. 80.52 cm
7. 76 cm
8. 2 designs, 5.8 cm of wire left over

Objective type questions:

- | | | |
|------|------|------|
| 1. a | 3. c | 5. a |
| 2. b | 4. a | 6. b |

Exercise: 6.2

1. a) 1386 cm^2 b) 346.5 m^2
2. a) 1.54 cm^2 b) 616 cm^2
3. $22,176 \text{ cm}^2$
4. 88 cm
5. $C = 22\text{cm}$, area = 30.25 cm^2
6. 622.5 cm^2
7. 308 cm^2 , 176 cm
8. 10.5 cm^2 , 25 cm
9. 16:25
10. 126 cm^2 , 84 cm
11. ₹98470
12. 42 cm^2

Objective type questions:

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

Exercise: 6.3

1. 15 cm, 1.5cm
2. Area at 8.03 is 256 cm^2 . Therefore the increase is 156 cm^2 .
3. 14π cm
4. 1:3:5
5. 192.5 cm^2
6. 103.62 cm^2
7. 50.24 cm^2
8. 221.76 m^2 , ₹12196.80
9. 1386 cm^2
10. 2144
11. ₹1462.50
12. 322.56 m^2 , 61.44 m^2
13. 3136 m^2 , 10.20 m^2
14. ₹2,57,460.

Miscellaneous problems:

1. 32 m, ₹10400
2. 616m^2 , 14m, ₹1760
3. 2016m^2 , 176 m
4. 117.25m^2
5. a. 1.32m, b. 132m
6. 134cm^2
7. 42 cm
8. 115.5cm^2 , 47 cm
9. 73.92m^2
10. 116m^2

Chapter - 7 COMPARING QUANTITIES

Exercise: 7.1

1. a. $4:5 = 8:10 = 40:50 = 12:15$
b. $3:4 = 9:12 = 30:40 = 12:16$
2. Teacher student ratio is
 $50:800 = 1:16$ (in school)
 $5:20 = 1:4$ (in daycare)
(kids need more care)
3. a. $25000:300 = 250:3$
b. $4000:250 = 16:1$
c. $5000:700 = 50:7$
4. a. $1000:200 = 5:1$
b. $190:1000 = 19:100$
c. $200:950 = 4:19$
5. a. They are not equivalent $\frac{6}{8} \neq \frac{16}{12}$
6 bags of rice and 8 bags of sugar is equal
to 12 bags of rice and 16 bags of sugar
b. $\frac{1}{5} \neq \frac{2}{20}$ They are not equivalent
1 train every 5 minutes to 4 trains every 20
minutes are equivalent
- 6 a. $56 \times \frac{2}{7}$ and $56 \times \frac{5}{7}$ ie. 16 and 40 students.

- b. $3500 \times \frac{3}{5}$ and $3500 \times \frac{2}{5}$ ie. 2100 and 1400
- c. $2 \times \frac{13}{12}$ and $2 \times \frac{9}{12}$ ie $\frac{1}{2}$ hrs and $1\frac{1}{2}$ hrs

7. a. In Proportion
b. Not in proportion 3:4 and 150:200 are in proportion
c. Not in Proportion 16:256 and 11:176 are in proportion

8. a. $x = 11$ b. $y = 9$ c. $a = 0.2$

9.

Mangoes	Weight	Mangoes	Weight
4	$\frac{2800}{3}$	11	$\frac{7700}{3}$
7	$\frac{4900}{3}$	15	3500
10	$\frac{7000}{3}$	12	2800

10. a. Total eggs = $10 \times 2 = 120$ eggs
Number of cracked eggs = 25
Ratio of good eggs to cracked eggs is 95:25
ie. 19:5
b. $1:21::30:x$ then $x = 21 \times 30 = 630$ students
c. Copper to tin ratio is 3:1 ratio used for
production $x : 40$
copper used $x = 40 \times 3 = 120$ gms

Exercise: 7.2

1. Time taken = $\frac{620}{10} \times 10 = 310$ minutes
2. Total time taken = 1 hr 45 min = 105 min
Fuel consumed = $105(\text{min}) \times 240(\frac{\text{lt}}{\text{mm}}) = 25200\text{lt.}$
3. Let the number of days in a month be 30 days.
Therefore total energy consumption in a
month = $30 \times 2 = 60\text{kwhr}$
4. Time taken to cover 2km is $2000\text{m} = \frac{2000}{4} \times 5 = 2500\text{mm}$
Distance farred in 4 hours = $240\text{ min} = \frac{240}{5} \times 4 = 192\text{m}$

5. News paper printed in 1 hr is 2000 news paper.
Therefore in 8 hrs 16000 newspapers will be printed.

Exercise: 7.3

1. a. Inverse variation
b. Direct variation
c. They are not in proportion

2. a.

x	$\frac{85}{8}$	24	$\frac{17}{8}$	16	3.4	$\frac{119}{80}$	0.4
y	25	$\frac{960}{17}$	5	$\frac{640}{17}$	8	3.5	$\frac{16}{17}$

b.

a	3.6	12	8	90	20	6
b	100	30	45	4	18	60

c.

x	7	2.5	5	15	60	21.6
y	8.4	3	6	18	72	25.92

3. 1. d) ₹693
2. //Note to teacher correction in question//
(if only 15 men are working, how long will it take for them to finish the work?)

Ans: (inverse variation) c) 60 days

3. c) Rs.10,000
4. c) 200km
5. b) 100kg
6. $\frac{30}{6} \times 25 = 125$ day of work
7. $48 \times 45 = 36 \times x \Rightarrow x = 60$ km/hr. (Inverse variation)
8. Inverse variation $35 \times 8 = 20 \times x$
 $x = 14$ is it will take 14 days.

Chapter - 8 PERCENTAGES AND MODELING SIMPLE INTEREST

Exercise: 8.1

1. a) $\frac{13}{80}$ b) $\frac{1}{3}$
2. 54%
3. a) 62.5% b) $33\frac{1}{3}\%$ c) 75%

4.

	Percentage	Fraction	Decimal	Ratio
1	37%	$\frac{37}{100}$	0.37	37:100
2	45%	$\frac{9}{20}$	0.45	9:20
3	25%	$\frac{1}{4}$	0.25	1:4
4	32.5%	$\frac{13}{40}$	0.325	13:40
5	250%	$\frac{250}{100} = \frac{5}{2}$	2.5	5:2
6	8%	$\frac{8}{100} = \frac{2}{25}$	0.08	2:25
7	101%	$\frac{101}{100}$	1.01	101:100
6	1%	$\frac{1}{100}$	0.01	1:100

5. 60%

6. a) Area A: $\frac{1}{4} = 25\%$,
Area B: $\frac{1}{8} = 12.5\%$,
Area C: $\frac{1}{6} = 16\frac{2}{3}\%$,
Area D: $\frac{1}{12} = 8\frac{1}{3}\%$

Percentage of the area that is not shaded: = 37.5%

b) Area A: $\frac{1}{4} = 25\%$,

Area B: $\frac{1}{8} = 12.5\%$,

Area C: $\frac{1}{16} = 6\frac{1}{4}\% = 6.25\%$,

Area D: $\frac{1}{8} = 12.5\%$

Percentage of the area that is not shaded:
= 43.75%

7. 26%

8. 25% , 6 : 9 : 5

Multiple Choice Questions:

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

Exercise: 8.2

1. 8 %

2. ₹470.40

3. ₹2581

4.

	CP(₹)	SP(₹)	Gain/Loss (₹)	Gain%/Loss%
(i)	350	400	Gain 50	Gain $14\frac{2}{7}\%$
(ii)	250	235	Loss 15	Loss 6%
(iii)	300	375	Gain 75	Gain 25%
(iv)	700	637	Loss 63	Loss 9%
(v)	640	736	Gain 96	Gain 15%

5. Selling Price of each bracelet:

₹14, Total Selling Price: ₹(14 × 40) = ₹560

Total Profit: ₹160, Profit %: 40%

6. 20%

7. ₹750

8. ₹45000

Multiple Choice Questions

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

Exercise: 8.3

1. Interest: ₹11000 Amount: ₹36000

2. Interest: ₹3825 Amount: ₹20825

3. Rate of interest: 12%

4. 3 years

5. ₹12500

6. Rate of interest: 7%

7. Time-period of deposit: 7 years

8. ₹18500

14. ₹220000

9. ₹42420

15. 9%

10. ₹43557.50

16. ₹500000

11. 4.5%

17. 4 yrs

12. 2 Yrs

18. ₹89790

13. 3.5 yrs

19. ₹40000

20. Principal: ₹6400, Rate of Interest: 6.25%

21. 5%

Multiple Choice Questions:

1. (c) 2. (d) 3. (a) 4. (d)

Challenge Questions:

1. Rate of interest: 6 %

2. Time period: 2 years

3. a) Rate of Interest: 20%

b) 10 years

c) 16 years

Chapter - 9 STATISTICS

Exercise: 9.1

1. 74.17 grams

2. 17

3. a) 25 b) 29 c) 21 d) 100

Observation: Adding 4 to each number increased the average by 4

Subtracting 4 from each number decreased the average by 4

Multiplying each number by 4 gave the new average as 4 times the first average.

4. $180.9 \frac{(180 \times 10) - 167 + 176}{10}$

5. 50 (Hint: Sum of six numbers = $40 \times 6 = 240$. If one of the numbers is excluded, sum of five numbers = $38 \times 5 = 190$; Excluded number: $240 - 190$)

6. 17

7. 38

8. 12

9. Median remains the same if one more number is added to it.

The observations arranged in ascending order:
2, 4, 5, 5, 7, 8.

If we add the number 5, the median will remain 5.

If we add a number less than 5 or more than 5,

2, 4, ⑤, 5, 7, 8 or 2, 4, 5, ⑤, 7, 8
↑ ↑ ↑ ↑ ↑ ↑

the median will anyway be 5.

10. Sum of the three numbers = $3 \times 7 = 21$. One of the numbers is 9.

$\therefore$ The sum of the other two numbers = $21 - 9 = 12$

The fact that there is a mode implies there is a repetition of numbers.

As the mode is the same as the median, we have two possibilities:

6, 6, 9 with mode = median = 6 or 3, 9, 9 with mode = median = 9

Both sets have the mean as 7.

Multiple Choice Questions:

1. b

2. a

3. d

4. b

5. d

Exercise: 9.2

1. a)

Number of calls	Tally marks	Frequency
14		5
15		7
16		3
17		4
18		2
19		3
20		6

The mode is 15 calls.

b)

Distance (in m)	Tally marks	Frequency
35		6
40		6
50		3
60		5
70		8
80		2

The mode is 70 m.

c)

Amount (in ₹)	Tally Marks	Frequency
3500		4
4000		3
4500		1
5000		1
5500		4
6000		4
6500		0
7000		5
7500		3

The mode is ₹7000

Chapter - 10 PRACTICAL GEOMETRY

Exercise: 10.1 & Exercise: 10.2

Student's work

Chapter - 11 PERIMETER AND AREA

Exercise: 11.1

- $2(l + b)$
- 4 times (3×6)
in perimeter $= 4 \times 3 \times 6 = 72$ cm
- $4 \times 3 \times 3 = 36$ cm
- $6 + 3 + (6 - 1) + (7 - 3) = 18$ cm
 - $6 + 1 + (10 - 1) + (6 - 1) = 21$ cm
 - $8 + 3 + 3 + 3 + 2 + 3 + 1 + 3 + 2 + 12 = 40$ cm
- Perimeter of equilateral triangle $= 3 \times 6 = 18$ cm
Perimeter of regular hexagon with side ' x ' $= 6x = 18$ cm
 $\therefore$ length of side of regular hexagon, $x = \frac{18}{6} = 3$ cm
- Perimeter of Rectangle $= 2(l + w)$
 $= 2(8 + 2) = 20$ cm
Perimeter of square with side ' a ' $= 4a = 20$ cm
Side, $a = \frac{20}{4} = 5$ cm

Exercise: 11.2

- area $= 35 \times 35 = 1225$ cm²
- length, $l = 6.32$ cm,
breadth, $b = 3.65$ cm
area $= l \times b = 6.32 \times 3.65 = 23.068$ m²
- Perimeter $= 16$ cm

L	W	A	Figure
7	1	7	R
6	2	12	R
5	3	15	R
4	4	16	S

Perimeter $= 20$ cm

L	W	A	Figure
9	1	9	R
8	2	16	R
7	3	21	R
6	4	24	R
5	5	25	S

Perimeter $= 24$ cm

L	W	A	Figure
11	1	11	R
10	2	20	R
9	3	27	R
8	4	32	R
7	5	35	R
6	6	36	S

R - Rectangle S - Square

Questions:

- We get more area when sides are comparable length and have more area when it is equal square.
- Yes square with side $= 4$ cm
Perimeter $= 4 \times 4 = 16$ cm
Area $= 4 \times 4 = 16$ cm²

c) Yes

L	W	A	P
4	4	16	16
6	2	16	20

d) Yes

- $A = \frac{1}{2} \times 6 \times 5 = 15$
 - $A = \frac{1}{2} \times (3 + 1) \times 4 = 8$
 - $A = \frac{1}{2} \times 12 \times 5 = 30$
 - $A = \frac{1}{2} \times 24 \times 24 = 288$

5. $A = \frac{1}{2} \times 4 \times 10 = 20$ cm²

6. $A = \frac{1}{2} \times 12 \times 4 = 24$ sq.ft.

7. $A = \frac{1}{2} \times 18 \times 9 = 81$ cm²

8. $A = \frac{1}{2} \times b \times 6 = 30 \Rightarrow b = 10$ cm

9. $A = \frac{1}{2} \times 2 \times h = 96 \Rightarrow h = 96$ cm

10. //Note to teacher: correction in question//

Find the cost of fencing a square garden with side 40 m, if the charges are ₹85 per meter.

Ans: Perimeter of square garden = 4×40
 $= 160 \text{ cm}$

Cost of fencing/meter = ₹85.

$\therefore$ Total cost = $85 \times 160 = ₹13600$.

11.	Wall	l	b	A	number	area
	1	4	3.5	14	2	28 m^2
	2	3.5	3	10.5	2	21 m^2

Total area = 49 m^2

Rate = 55 per sq.m

$\therefore$ Cost of painting = 49×55
 $= (50 - 1)(50 + 5)$
 $= 2500 + 250 - 50 - 5$
 $= ₹2695$

12. Area = $\frac{1}{2} \times 1.5 \times 2.3 = 1.725 \text{ m}^2$

13. Perimeter, $4a = 400 \text{ m}$

Side, $a = \frac{400}{4} = 100 \text{ m}$

Area, $a^2 = 100^2 = 10000 \text{ m}^2$

14. Perimeter of square, $= 4 \times 20 = 80 \text{ cm}$

if length of rectangle = 16 cm .

then breadth of rectangle = 24 cm

a) length of wire = perimeter of square = 80 cm .

b) Area of square = $20^2 = 400 \text{ cm}^2$.

c) Area of rectangle = $16 \times 24 = 384 \text{ cm}^2$.

Exercise: 11.3

1.

Figure	Dimension	Area	Formula
Square	$a = 4 \text{ cm}$	16 cm^2	(a^2)
Rectangle	$l = 6 \text{ cm}$ $b = 4 \text{ cm}$	24 cm^2	$(l \times b)$
Triangle (1)	$b = 3$ $h = 4$	6 cm	$(\frac{1}{2} \times b \times h)$
Triangle (2)	$b = 3, h = 4$ $b = 4 \text{ cm},$ $h = 2 \text{ cm}$	4 cm^2	$(\frac{1}{2} \times b \times h)$

Total area = 50 cm^2

2.

Figure	Dimension	Area	Formula
Triangle	$b = 2 \text{ cm}$ $h = 2 \text{ cm}$	2 cm^2	$(\frac{1}{2} \times b \times h)$
Square	$a = 2 \text{ cm}$	4 cm^2	(a^2)
Rectangle	$l = 4 \text{ cm}$ $b = 2 \text{ cm}$	8 cm^2	$(l \times b)$

Total area = 14 cm^2

3.

Figure	Dimension	Area	Formula
Rectangle	$l = 8 \text{ cm}$ $b = 3 \text{ cm}$	24 cm^2	$(l \times b)$
Triangle	$b = 8 \text{ cm}$ $h = 3 \text{ cm}$	12 cm^2	$(\frac{1}{2} \times b \times h)$

4. a) $A = \frac{1}{2} \times b \times h = \frac{1}{2} \times 5 \times 12 = 30 \text{ cm}^2$

b) $A = a^2 = 13^2 = 169 \text{ cm}^2$

c) $A = a^2 = 5^2 = 25 \text{ cm}^2$

d) $A = a^2 = 12^2 = 144 \text{ cm}^2$

//Note to teacher: Omit question:

Find area of the obtuse triangle.

Write the area in b, c, and d.//

5.

Figure	Dimension	Area	Formula
Square	$a = 20 \text{ cm}$	400 cm^2	(a^2)
Triangle	$b = 20 \text{ cm}$ $h = 14 \text{ cm}$	140 cm^2	$(\frac{1}{2} \times b \times h)$

Total area = 540 cm^2

Exercise: 11.4

1. $A = b \times h = 22 \times 6 = 132 \text{ cm}^2$.

2. $A = b \times h = 12 \times 5 = 60 \text{ m}^2$.

3. $A = 72 = b \times b = b \times 9 \Rightarrow b = \frac{72}{9} = 8 \text{ cm}$.

4. $b = 12 \text{ cm}, A = 108 \text{ cm}^2 \Rightarrow \text{height}, h = \frac{108}{12} = 9 \text{ cm}$.

5. $d_1 = 16 \text{ m}, d_2 = 30 \text{ m} A = \frac{1}{2} \times d_1 \times d_2 = \frac{1}{2} \times 16 \times 30 = 240 \text{ m}^2$.

Both Rhombos has same area.

6. Perimeter of rhombus = 60 cm

$$\text{Side, } a = \frac{60}{4} = 15 \text{ cm.}$$

$$d_1 = 15 \text{ cm, } d_2 = 20 \text{ cm}$$

$$\text{Area} = \frac{1}{2} \times 15 \times 20 = 150 \text{ cm}^2$$

Exercise: 11.5

1. $A = \frac{1}{2} \times (6.6 + 12.4) \times 6 = \frac{1}{2} \times 9 \times 6 = 57 \text{ cm}^2$

2. $A = \frac{1}{2} \times (4.5 + 9) \times 8 = 54 \text{ cm}^2$

3. $A = \frac{1}{2} \times (a + b) h$

a) $A = \frac{1}{2} \times (21 + 24) \times 6 = 135 \text{ cm}^2$

b) $A = \frac{1}{2} \times (1.8 + 2.4) \times 1.5 = 3.15 \text{ m}^2$

c) $A = \frac{1}{2} \times (1.8) \times 1.2 = 1.08 \text{ m}^2$

4. $A = 225 \text{ cm}^2$

$$(a + b) = 27 \text{ cm}$$

$$A = \frac{1}{2} (a + b) h \Rightarrow h = \frac{2A}{a + b} = \frac{2 \times 225}{27} = 16.67$$

5. $A = 125.5 \text{ cm}^2$

$$a = 7.7 \text{ cm}$$

$$b = 12.3 \text{ cm}$$

$$h = \frac{2A}{(a + b)} = \frac{2 \times 125.5}{(7.7 + 12.3)} = \frac{251}{20} = 12.55 \text{ cm}$$

6. Area, $A = 65 \text{ cm}^2$,

$$h = 13 \text{ cm}$$

$$a = 6.3 \text{ cm}$$

$$A = \frac{1}{2} (a + b) h = \frac{1}{2} (6.3 + b) \times 13 = 65$$

$$b = 3.7 \text{ cm}$$

More Exercise: 11.6

1. length of rectangular ground, $l = 65 \text{ m}$

breadth of rectangular ground $b = 32 \text{ m}$

$$\text{Area} = l \times b = 32 \times 65 = 2080 \text{ m}^2$$

Rate for levelling = ₹3/m².

$$\text{Total cost for levelling} = 3 \times 2080$$

$$= ₹6240$$

2. Dimensions of room

length = 9 m

breadth = 7 m

Side of square tile = 0.9 m

Area of a square tile = $0.9^2 = 0.81 \text{ m}^2$.

Number of tiles required = 77.78 tiles.

Rate of tiles = ₹8/tile

$$\text{Cost of tiling} = \frac{8 \times 63}{0.81} = 622.2$$

$$₹622.2$$

3. Perimeter of the square courtyard = 144 m

$$\text{Side of courtyard} = \frac{144}{4} = 36 \text{ m.}$$

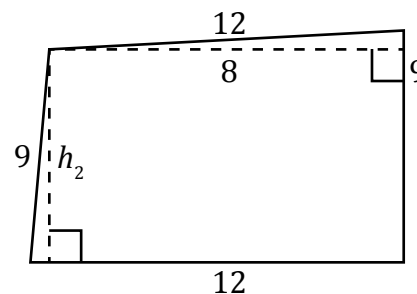
Area of square courtyard = $36^2 = 1296 \text{ m}^2$.

Rate of cementing = ₹660/m²

$$\text{Cost of cementing} = 6.60 \times 1296$$

$$= ₹8553.6.$$

4. Distance between shorter sides ie. 9cm sides = 8cm



$$\therefore \text{Area of parallelogram} = 8 \times 9 = 72 \text{ cm}^2$$

Area = distance between longer side $\times$ length longer side

$$\text{ie. } 72 \text{ cm}^2 = h_2 \times 12$$

$$h_2 = \frac{72}{12} = 6 \text{ cm}$$

5. Diagonals of the rhombus are $d_1 = 40 \text{ cm}$ and $d_2 = 25 \text{ cm}$

$$\text{Area of rhombus} = \frac{1}{2} \times d_1 \times d_2 = \frac{1}{2} \times 40 \times 25$$

$$= 500 \text{ cm}^2$$

Rate of polishing = ₹5.50/cm²

$$\text{Cost of polishing} = 5.50 \times 500 = ₹2750$$

6. Given $a = 20\text{cm}$, $b = 26\text{cm}$, $h = 18\text{cm}$

$$\begin{aligned}\text{Area} &= \frac{1}{2}(a + b)h = \frac{1}{2}(20 + 26) \times 18 \\ &= 414\text{cm}^2\end{aligned}$$

7. Trapezium ADCE

Parallel sides: AE and DC

Non parallel sides: AD and CE

$$\begin{aligned}\text{Area of trapezium} &= \frac{1}{2} \times (6 + 3) \times 6 \left(\frac{1}{2}(\overline{AE} + \overline{DC}) \times \overline{AD} \right) \\ &= 27\text{cm}^2\end{aligned}$$

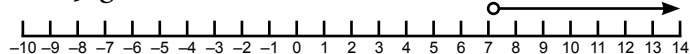
Chapter - 12 ALGEBRAIC IDENTITIES AND INEQUALITIES

Exercise: 12.1

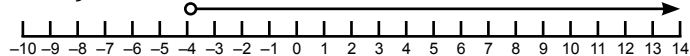
1. a) $<$ b) $<$ c) $<$ d) $<$ e) $<$

2. A) a B) c

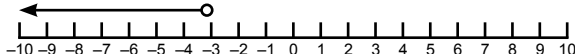
3. a) $g > 7$



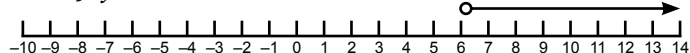
- b) $c > -4$



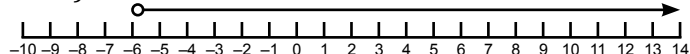
- c) $m < -3$



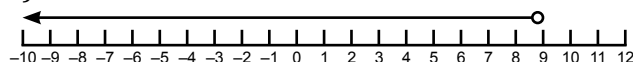
- d) $j \geq 6$



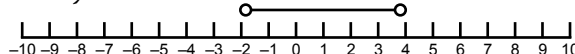
- e) $h > -6$



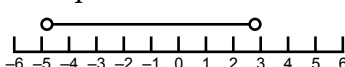
- f) $k \leq 9$



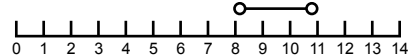
- g) $-2 < y < 4$



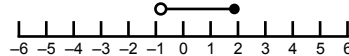
- h) $-5 \leq p \leq 3$



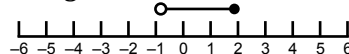
- i) $8 \leq n < 11$



- j) $-1 < t \leq 2$



- k) $11g - 5 \leq 7g + 3 \Rightarrow 11g - 7g \leq 8 \Rightarrow 4g \leq 8$
 $\Rightarrow g \leq 2$



4. a) $a < 11$ b) $a \leq \frac{11}{5}$ c) $t \geq 7$ d) $m > -7$
 e) $n \geq 7$ f) $p \geq -30$ g) $d \leq 7$

5. 15

Exercise: 12.2

1. a) $m^2 + 12m + 36$

b) $25p^2 + 130pq + 169q^2$

c) $64c^2 - 16c + 1$

d) $81a^2 - \frac{9}{2}a + \frac{1}{16}$

e) $121n^2 - 49p^2$

f) $2.56w^2 - 0.25$

g) $9b^4 - 4a^4$

h) $25q^2 - 30pq + 9p^2$

i) $100x^4 - 80x^2y + 16y^2$

j) $81d^2 - \frac{16}{c^2}$

k) $49g^2 - 25h^2$

l) $\frac{m^2}{16} + \frac{mn^2}{3} + \frac{4n^4}{9}$

2. a) $p^2 + \frac{28}{7}p + \frac{132}{7}$

b) $16a^2b^2c^2 - 12abc - 40$

c) $\frac{4}{9}w^4 - \frac{1}{16}vw^2 + 63v^2$

d) $36r^2s^2t^2 + 90rst + 56$

e) $144g^2 - 63gh + \frac{10}{9}h^2$

f) $h^2 - 1.5gh + 0.54g^2$

g) $100 + 60pq - 91p^2q^2$

h) $10.2cd - 8.16$

3. a) $(a-b)(a+b) + (b-c)(b+c) + (c-a)(c+a)$
 $= a^2 - b^2 + b^2 - c^2 + c^2 - a^2 = 0$

b) $(4k+11)^2 - 176k = 16k^2 + 88k + 121 - 176k$
 $= 16k^2 - 88k + 121$
 $= (4k-11)^2$

c) $(3c-5d)^2 + 60cd = 9c^2 - 2(3c)(5d) + 25d^2 + 60cd$
 $= 9c^2 - 30cd + 25d^2 + 60cd$
 $= 9c^2 + 30cd + 25d^2$
 $= (3c+5d)^2$

d) Given in textbook

4. a) $56ad$ b) $242c^2 + 50d^2$
c) $162m^2 + 288m + 128$
d) $8.4(c^2 + d^2)$ e) $x^2y^2 + y^2z^2$

5. a) 289 b) 337

6. (I) a) 5329 [Expanding $(70+3)^2$]
b) 998001 [Expanding $(1000-1)^2$]
c) 92416
d) 17.64
e) 79.21

(II) a) 89271 [Using $(300-27)(300+27) = 300^2 - 27^2$]

b) 882000 [Using $941^2 - 59^2 = (941+59)(941-59) = 1000 \times 882 = 882000$]

c) 320 d) 0.32 e) 359.975
f) 1209.1 g) 367836 h) 997985
i) 2479.55 j) 38024

7. a) $x = 144$ //correction in question:
 $13x = 84^2 - 72^2$ //
b) $y = 296$

8. a) 18 b) 14 c) 6 d) 35

9. a) 198 b) 9.1104 c) 19.94 d) 47

10. a) $a^4 - 2401$

b) $b^4 - \frac{1}{256}$

c) $(x^2 - 25)^2$

d) $a^4 - 96a^2 + 2500$

e) $p^{16} - q^{16}$

11. a) 9 and 2

b) 10 and 2

c) 14 and 8

12. a) $(4m+11)^2$

b) $(10a-7b)^2$

c) $(6p-b)^2$

d) $(13x+5y)^2$

e) $(3v+7w)(3v-7w)$

f) $(14abc+1)(14abc-1)$

g) $(8a+15b)^2 - 1$

h) $(a-b)^2 - 102$

13. A) c

B) a

C) b

D) b

E) c

14. 8280 sq. m

15. 1750 sq. m

H.O.T.S:

1. 841 sq. m

2. 49 sq. m //correction in question: If a square lawn has a 2.5 m wide path surrounding it and the area of the path is 144 m², find the area of lawn.//

Chapter - 13 EXPONENTS AND POWERS

//Note to teacher: Page 251, correction in the example

$$64 = 4 \times 4 \times 4 = 4^3 //$$

Try these out Page 253

Number	Expanded Form	Exponential Form	Base	Exponent
6561	$9 \times 9 \times 9 \times 9$	94	9	4
1331	$11 \times 11 \times 11$	Correction in text: 11 ³	11	3
512	$8 \times 8 \times 8$	83	8	3
3125	$5 \times 5 \times 5 \times 5 \times 5$	55	5	5
-343	$(-7) \times (-7) \times (-7)$	$(-7)3$	(-7)	3
169	13×13	132	13	2

//Note to teacher: Page 256, Section 13.2, Law of exponents - Correction in product rule: Typo error:

$$a^m \times a^n = a^{(m+n)}$$

//note to teacher: Page 257, Example problem

(iv) $81 \times 128 \times 729 \times 32$.

In the last line: $3^{(4+6)} \times 2^{(7+5)} = 3^{10} \times 2^{12}$.

Exercise: 13.1

1. a) 87, 9
b) $w \times w \times w \times t \times t \times t \times t \times t \times t$
c) 54 raised to the power of 18 or 54 to the power of 18 or 54 power 18
d) 9933
e) 2
f) 3
g) 1
h) 101
2. a) (b) b) (a) c) (d) d) (d) e) (c)
f) //Correction in question: Typo error:
 $m^c = m^{65} \times m^5$, Ans (c)//
g) b) h) a)
i) //Correction in question: Typo error:
 $14^4 \times 15^4$ Ans: (d)//
j) (a) k) (a)
l) //Correction in question: Typo error:
 $2^{99} + 2^{99}$ Ans: (a)
3. a) False b) True c) False d) True
e) False f) False
4. a) 47^5 b) z^3 c) $19^2 \times 91^3$ d) $54 \times b^2$
5. a) 256 b) 243 c) 125 d) 6561
e) 256
6. a) //Note to teacher: Correction In question:
 3^7 or 7^3 Ans: 7^3
b) 6^5 c) 11^2
7. a) 26 or 43 or 82 b) 35 c) 113
d) 74 or 492 e) 210 or 45
f) 56 or 253 or 1252
8. a) 900000 b) 400 c) 12348
d) 500 e) -392 f) -1152
g) 2592 h) 27000 i) 160000
j) 256

9. a) 71^{g+9} b) 29^{32} c) $(5w)^{25}$
d) n^2 e) $(\frac{87}{2})^{14}$ f) 26^5
g) 46^{30} h) 1 i) 918^{53}
j) 201^d k) $(-89)^{12} = 89^{12}$ l) 9^{18}
10. a) 57 b) 3121 c) 49 d) 9
e) 243 f) 27 g) 2187
11. a) 8000 b) 125 c) 1008
d) 992 e) 1000000
12. a) 7^{59} b) 79^{391} c) 38^{25}
d) Note to teacher: Correction in the question
 $\frac{9^6 \times m^7 \times n^5}{n \times 9^2 \times m^3}$ Ans: $(9mn)^4$
e) 30^{62} f) 252^3 g) 24^8 h) 15^7

Exercise: 13.2

1. a) 5 b) 0 c) 6 d) 0
e) 1 f) 1 g) odd h) even
2. a) 0 b) 5 c) 1 d) 0
e) 6 f) 5 g) 1 h) 6
i) 4 j) 1 k) 9 l) 6
3. a) 3 b) 4 c) 1 d) 2
e) 9 f) 7 g) 8 h) 6
i) 6 j) 9 k) 7 l) 8
4. a) 1 b) 1 c) 1 d) 0
e) 7 f) 8 g) 7 h) 7
5. i) (a) ii) (d) iii) (c)

Exercise: 13.3

1. a) $9dc^2$ and $-17c^2d$ are like terms; $99cd^2$ and d^2c are like terms
b) $-mn$, $7nm$, nm and $7mn$ are like terms;
 $-7n^3m$ and $4n^3m$ are like terms

c) $12b^3a^2c$ and $-2a^2b^3c$ are like terms

2. a) False b) False c) True
 d) False (Only positive integer)
 e) False (Degree: 3)
 f) True
 g) False (Degree: 4)
 h) False (It is 100)

3. a) 10 b) 0 c) $-2a^2b^2$ d) -3

4. a) Ans: (c)
 b) //Note to teacher: Correction in the option:
 a) Monomial b) Binomial
 c) Trinomial d) Quadrinomial
 Ans: (d)
 c) Ans: (a)
 d) Ans: (a)

5.

S.No.	Algebraic Expression	Degree 1 st Term	of 2 nd term	The 3 rd Term	Terms 4 th Term	Degree of the Expression
1.	$15a^3 - 21a^2 - a + 4$	3	2	1	0	3
2.	$a^2b3c - 9abc^2 + bc^7 - bc$	6	4	8	2	8
3.	$wt^2 - 4z + 7w^2t^2z^4 + 15$	3	1	8	0	8
4.	$8m^2 + 8m^3n^3 + 8mn - 8$	2	6	2	0	6
5.	$2n^3m^2 - 6m^3n - 3mn^2 + nm$	5	4	3	2	5
6.	$101 + 5a^2 + 21ab + 9b^3$	0	2	2	3	3
7.	$c^4d - c^3d^2 - c^2d^3 + cd^4$	5	5	5	5	5

6. a) $5d^5 + 6d^2 - 17d$, Degree: 5
 b) $-6a^2 - 25a + 26$, Degree: 2
 c) $9m^2n + 2n^2m + 9mn + 14m - 3n$, Degree: 3
 d) $10c^4 + 2c^2 + 15cd - 13d^2 - 4$, Degree: 4
 e) $7p^2 - 4q^2 + 4p - 9q$, Degree: 2
 f) $-13a^2 + 5ab + 21b^2$, Degree: 2
 g) $8m^2 - 10m - 11$, Degree: 2
 h) $9k^2 - 21$, Degree: 2

Exercise: 13.4

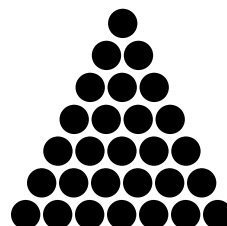
1. a) //Note to teacher: Correction in question:
 $7^3 \times 7^v = 7^{11}$ Ans: $v = 8$
 b) $v = 1$ c) $v = 6$
 2. (-1)
 3. a) 6 b) 5

4. a) 96 b) 64
 5. Degree: 6
 6. Perimeter: $14a^2 + 20ab - 4b^2$

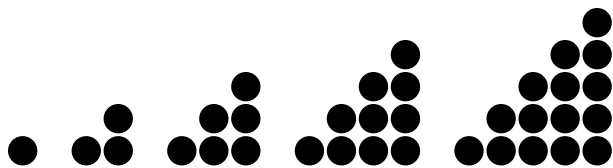
Chapter - 14 PATTERNS AND SYMMETRY

Exercise: 14.1

1.

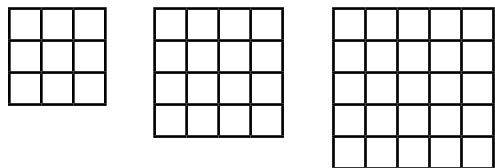


2.



3. $10 + 15 + 35$

4.

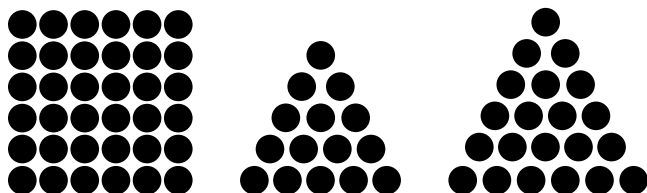


9

16

25

5.



6. a) $2n + 5$

b) $4n + 1$

c) $2n - 1$

7. Blue $4n + 2$, white n

8. Blue $\frac{n(n+1)}{2}$, white $\frac{n(n+1)}{2}$, total $= n(n+1)$,

The triangular numbers are 15 and 15.

Adding two identical triangular numbers we get a rectangle of sides n and $n+1$.

Exercise: 14.2

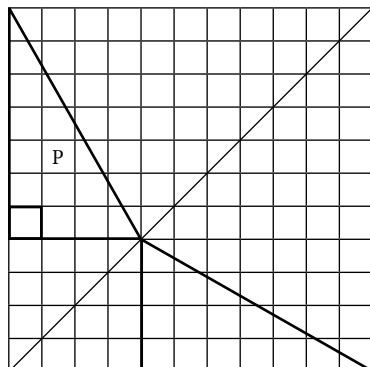
1. Q, R, S

2. i) 72° ($\theta = \frac{360^\circ}{5}$)

ii) 6 ($60^\circ = \frac{360}{x} \Rightarrow x = \frac{360}{60} = 6$)

3. P, R, S

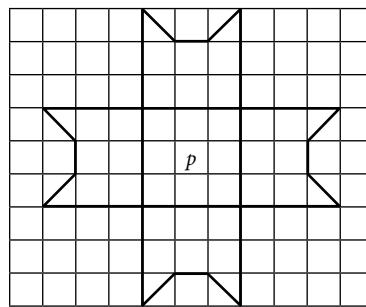
4.



5. Angle of rotation is 90°

Order of rotational symmetry is 4

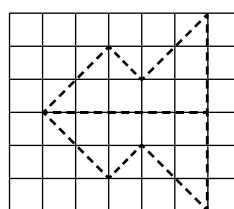
6.



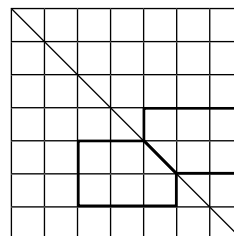
7. a) 2

b) 4

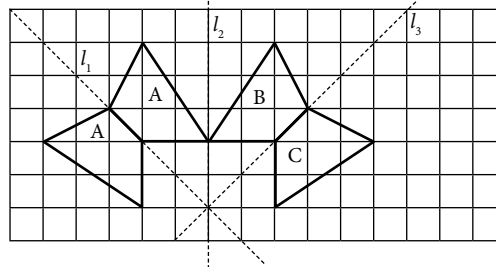
8. a)



b)



9.



10. i) reflection in a vertical line

ii) rotation 90° anticlockwise

iii) translation

iv) translation

v) rotation 90° clockwise

vi) reflection in a vertical line

Chapter - 15A INFORMATION PROCESSING

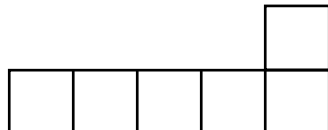
Exercise: 15.1

1. **Note:** All Questions below

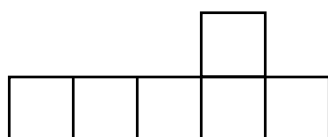
Draw in a graph paper and colour differently, use squares.



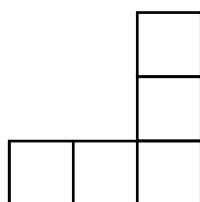
I



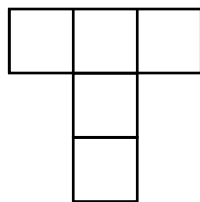
L



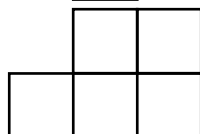
Y



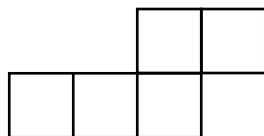
V



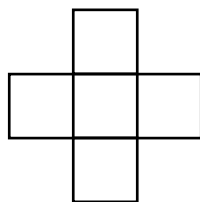
T



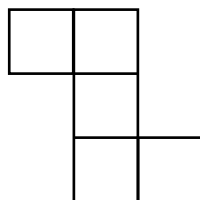
P



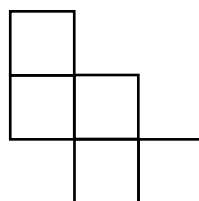
N



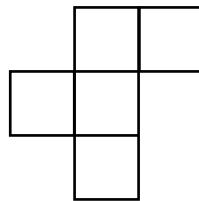
X



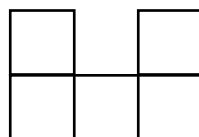
Z



W

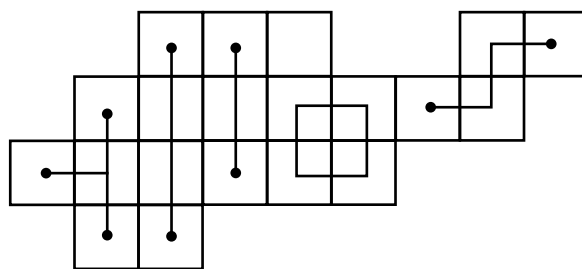
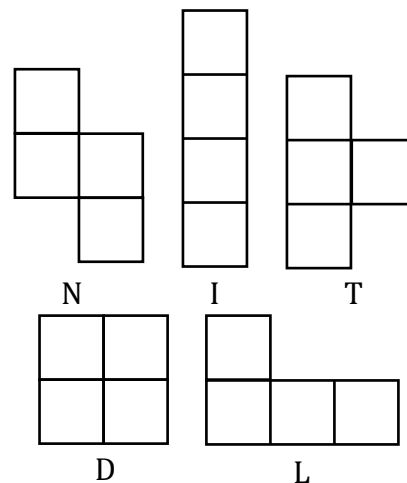
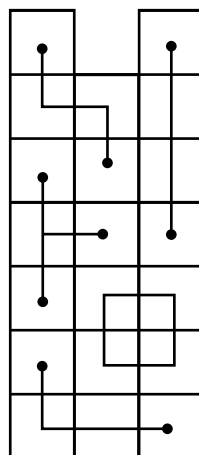


F

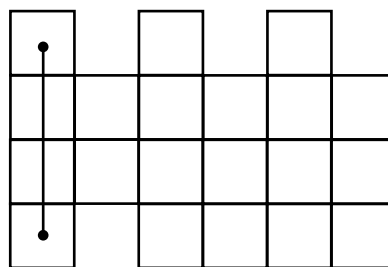


U

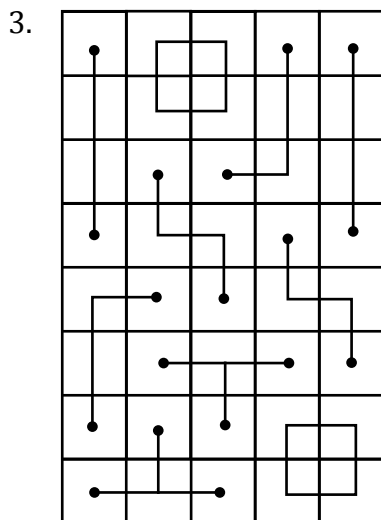
2.



TILON



c. Not possible to cut without repetition



4. Answer may vary. Left to the students [Hint: It is not possible only using tetrominoes. You may have to use monominoes, dominoes, trominoes]

5. (1) and (2) are of same shape.

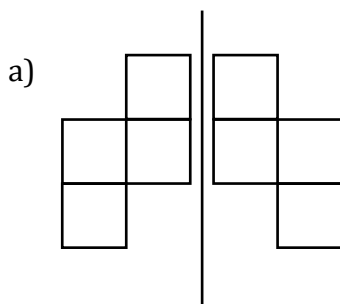
Move (1) 5 squares to right, we get (2)

$\Rightarrow$ (2) and (3) are of same shape.

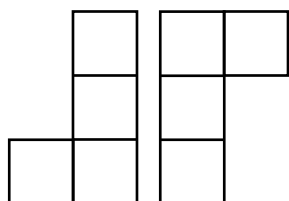
$\Rightarrow$ Move (2) 5 squares to right and 2 squares upward we get (3).

$\therefore$ (1), (2), (3) are of the same shape.

6.

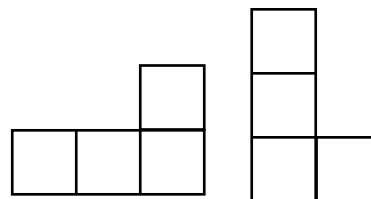


Reflection



Translation $\rightarrow$ 3 units right

Rotation $\rightarrow$ 180



Rotation $\rightarrow$ 90

Translation $\rightarrow$ 3 units right

Exercise: 15.2

Note: Questions 1,2,3 answers may vary, left to students

4. House $\rightarrow$ Garden, 15km is the shortest way.

House $\rightarrow$ Airport $\rightarrow$ Playground $\rightarrow$ Garden
[distance = $25+17+6+5+30=83\text{km}$]

House $\rightarrow$ supermarket $\rightarrow$ Airport $\rightarrow$
Playground $\rightarrow$ Garden

[distance = $7 + 30 + 17 + 6 + 5 + 30 = 94\text{km}$]

Exercise: 15.3

1.

Figure no.(x)	1	2	3	4	5	...
No. of sticks (y)	2	4	6	8	10	...

$$y = 2x$$

2.

Figure no.(x)	1	2	3	4	...
No. of dots (y)	4	7	10	13	...

$$y = 3x + 1$$

3.

Figure no.(x)	1	2	3	4	...
No. of sticks (y)	4	10	16	22	...

To verify the relationship : $y = 6x - 2$

For $x = 1, y = 4 = 6(1) - 2$

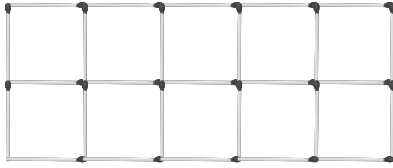
For $x = 2, y = 10 = 6(2) - 2$

For $x = 3, y = 16 = 6(3) - 2$

For $x = 4, y = 22 = 6(4) - 2$

Hence the relationship $y = 6x - 2$ is verified.

4. The next figure would be:



The number of matchsticks required = 27

The relationship:

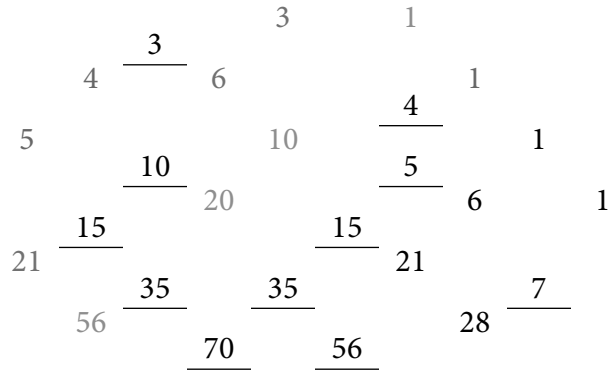
$y = 5x + 2$ where x denotes the figure no. and y denotes the number of sticks in that.

5. i) (c) $y = 6x - 1$

ii) (a) $y = -5x + 7$

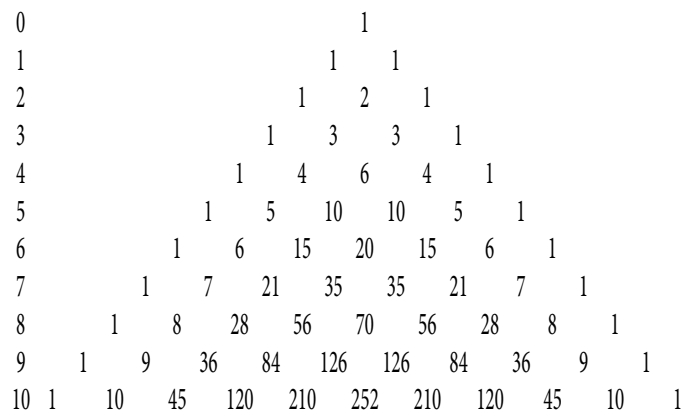
iii) (c) $y = 2^{x-1}$

Try this (Page 315)

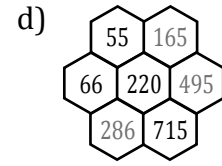
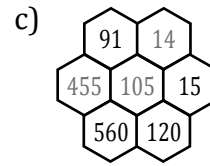
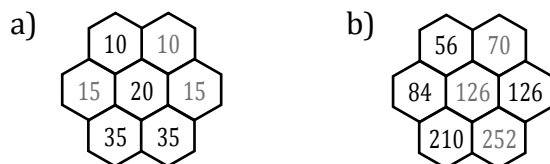


Exercise: 15.4

1.



2. a) Correction in the question:



3. 210, 55

5. 70, row 8

4. $256, 2^8$

6. 0, 0.

Objective type questions:

1. (b) 2. (a) 3. (a) 4. (c) 5. (a)

Miscellaneous Questions:

1. (a)

Figure no. (x)	1	2	3	4	...
No. of sticks (y)	6	11	16	21	...

$$y = 5x + 1$$

(b)

Figure no. (x)	1	2	3	4	...
No. of sticks (y)	5	8	11	14	...

$$y = 3x + 2$$

2. Fill in the missing numbers in the table given below.

Diagram	1	2	3	4	n
Area	1	4	9	16	n^2
Number of dots	4	9	16	25	$(n+1)^2$
Number of 1 cm line segments	4	12	24	40	$2n(n+1)$

3. Student's work

Chapter - 15B ALGORITHM AND FLOW CHART

Exercise: 15.5

1. a) False b) True c) False
d) True e) False

Questions 2, 3 and 4 – Students' work

5. a. i) Start
 ii) Accept three numbers N1,N2 AND N3
 iii) Compute the average using the formula

$$AVG = \frac{N1 + N2 + N3}{3}$$

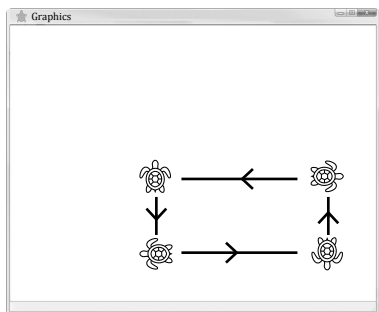
 iv) Display the result AVG
 v) Stop
- b. i) Start
 ii) Accept the radius of the circle as R
 iii) Compute the are using the formula

$$A = 3.14 \times R^2$$

 iv) Display the result A
 v) Stop
- c. i) Start
 ii) Accept the length of the cuboid L.
 iii) Accept the breadth of the cuboid B.
 iv) Accept the length of the cuboid H
 v) Compute the volume V using the formula $V = L \times B \times H$
 vi) Display the result V
 vii) Stop
- d. i) Start
 ii) Accept the principal amount P
 iii) Accept the number of years N
 iv) Accept the rate percent R
 v) Compute the simple interest using the formula $SI = (P \times N \times R) \div 100$
 vi) Compute the amount using the formula $A = P + SI$
 vii) Display the result SI, P
 viii) Stop
- e. i) Start
 ii) Take the compass using the radius measurement R1 draw a circle with center "O"
 iii) Using the same center "O", with different radius measurement R2, draw another circle.
 iv) Using the same center "O" with different radius measurement R3, draw another circle.
 v) Stop

6. a. i) Start
 ii) Move backward 40 steps
 iii) Turn left 90°
 iv) Move backward 60 steps.
 v) Turn left 90°
 vi) Move backward 40 steps
 vii) Turn left 90°
 viii) Move backward 60 steps
 ix) Turn left 90°
- b. i) Start
 ii) Move forward 40 steps
 iii) Turn right 90°
 iv) Move forward 80 steps
 v) Turn right 90°
 vi) Move forward 40 steps
 vii) Turn right 90°
 viii) Move forward 80 steps
 ix) Turn right 90°
 x) Stop
- c. i) Start
 ii) Repeat 4 times "Move backward 20 steps and Turn left 90° "
 iii) Stop
- d. i) Start
 ii) Repeat 3 times "Move forward 30 steps and Turn right 120° "
 iii) Stop
7. 1) Start
 2) Move backward 40 steps
 3) Turn left 90°
 4) Move backward 60 steps.
 5) Turn left 90°
 6) Move backward 40 steps
 7) Turn left 90°
 8) Move backward 60 steps
 9) Turn left 90°
 10) End

Diagram

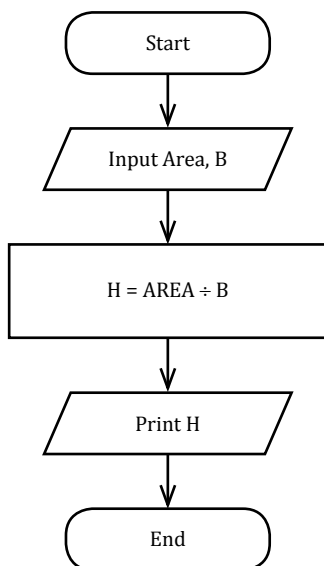


Exercise: 15.6

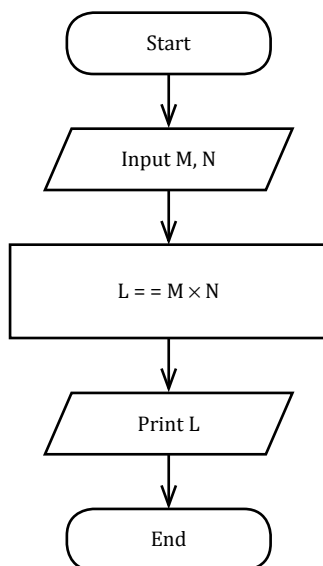
Students' work

Exercise: 15.7

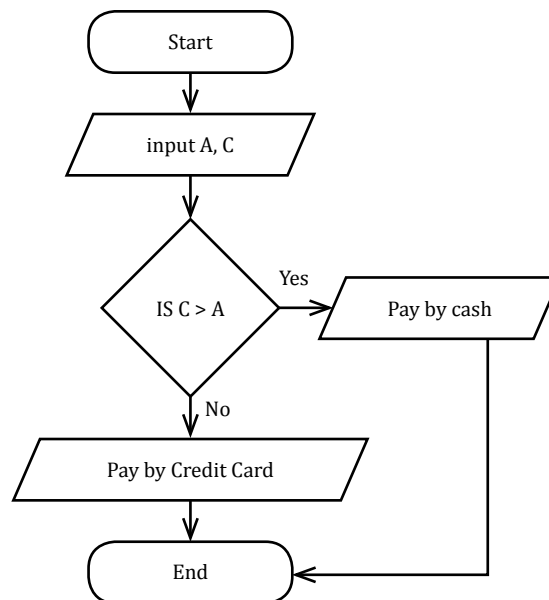
1. a)



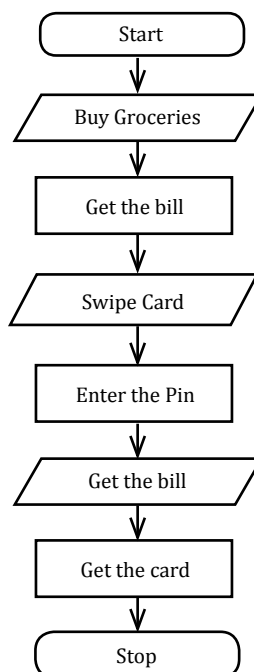
b)



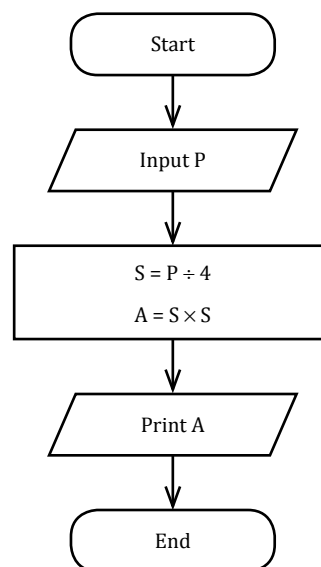
c)

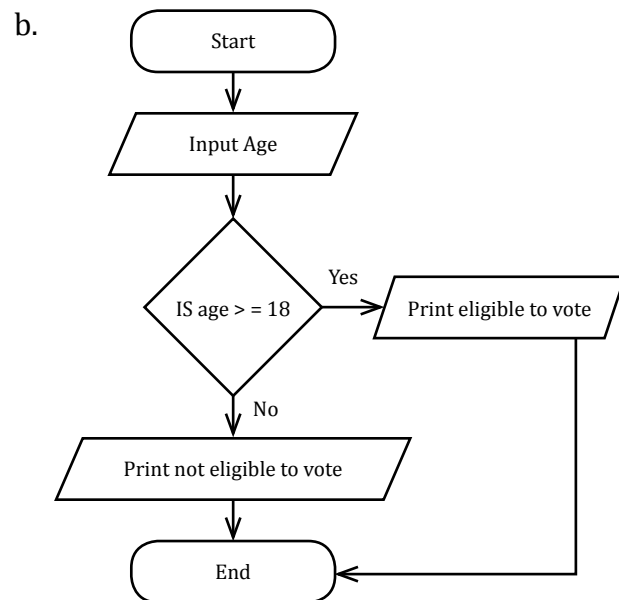
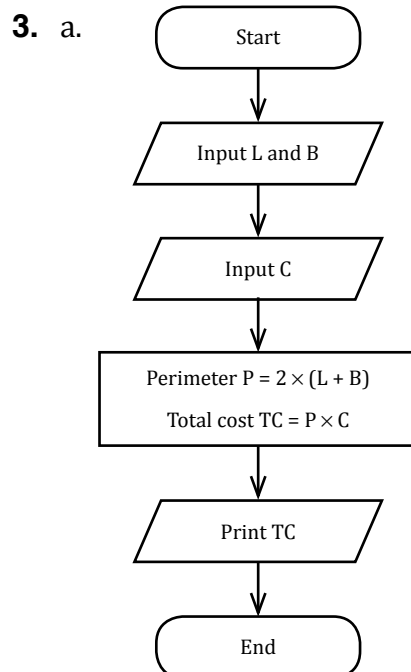
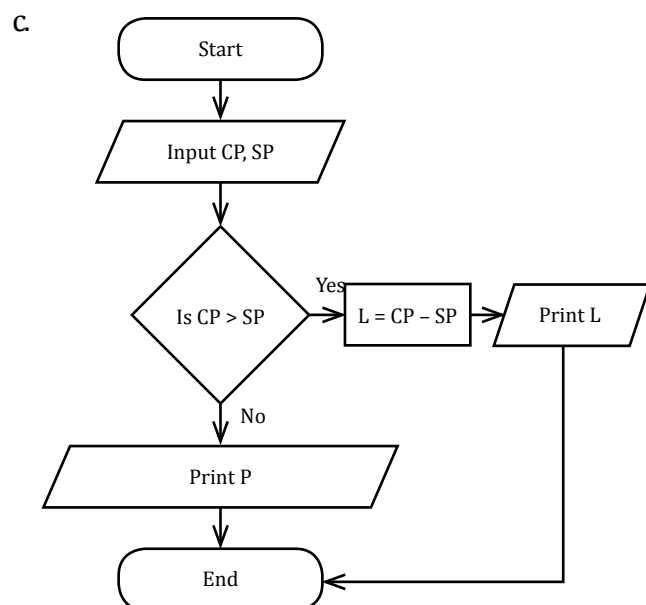
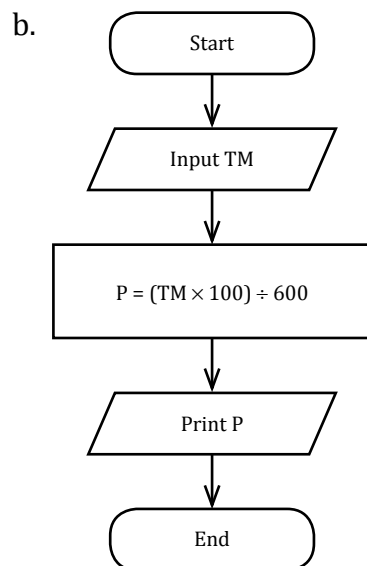


d)



2. a)





4. a. The flow chart given is to find the Selling price of an item when cost price and profit are given.

b. The flow chart is given to find out the given year is leap year or not.

5. Challenging sum:

