ANSWERS

Unit 1

1. (d) **2.** (b) **3.** (a) **4.** (d) **5.** (a) **6.** (a)

7. (a) **8.** (c) **9.** (b) **10.** (b) **11.** (a) **12.** (c)

13. (b) **14.** (d) **15.** (a) **16.** (a) **17.** (b) **18.** (d)

19. (d) **20.** (a) **21.** (a) **22.** (a) **23.** (d) **24.** (a)

25. (b) **26.** $\frac{45}{63}$ **27.** $\frac{35}{45}$ **28.** $\frac{35}{40}$

29. positive rational number **30.** negative rational number

31. no **32.** 1, –1 **33.** x^2 **34.** $\frac{-45}{8}$ or $-5\frac{5}{8}$

35. $(657)^{-1}$ **36.** –1 **37.** $\frac{a}{b}\times\frac{c}{d}+\frac{a}{b}\times\frac{e}{f}$

38. more **39.** infinitely many **40.** opposite

41. positive **42.** order **43.** $\frac{-7}{5}$ **44.** $\frac{3}{4}$

45. $\frac{1011}{100}$ **46.** $\frac{1}{5}\times\frac{3}{8}$ **47.** –3 –4 **48.** False

49. False **50.** True **51.** True **52.** False **53.** True **54.** True

55. True **56.** False **57.** False **58.** True **59.** False **60.** False

61. False **62.** False **63.** True **64.** True **65.** False **66.** False

67. True **68.** False **69.** False **70.** False **71.** False **72.** False

73. False **74.** False **75.** True **76.** False **77.** False **78.** False

79. False **80.** True **81.** False **82.** False **83.** True **84.** False
85. False **86.** False **87.** False **88.** True **89.** True **90.** True
91. True **92.** True **93.** True **94.** False **95.** True **96.** True
97. False **98.** True **99.** True

100. $\frac{8}{4}, \frac{9}{3}, \frac{6}{3}, \frac{4}{2}, \frac{1}{1}, \frac{0}{1}, \frac{-1}{1}, \frac{-2}{1}, \frac{-4}{2}, \frac{-6}{2}$ **101.** $\frac{64}{16}, \frac{36}{-12}, \frac{5}{-4}, \frac{140}{28}$

102. a) $\frac{-8}{9}$ b) $\frac{-256}{35}$ **106.** (a) $\frac{25}{8}$ (b) $\frac{-4}{75}$ (c) $\frac{17}{70}$ (distributive law)

107. Associative property

111. (a) $6\frac{7}{8}$ (b) $-3\frac{1}{3}$ (c) $\frac{-11}{8}$ or $-1\frac{3}{8}$ (d) $\frac{-88}{3}$ or $-29\frac{1}{3}$

112. (a) $\frac{142}{15}$ or $9\frac{7}{15}$ (b) $\frac{2}{7}$ (c) $\frac{32}{63}$ (d) $\frac{41}{48}$

113. $\frac{-7}{3}$ as it is smaller than –1 whereas rest of the numbers are greater than –1

114. Rs 18 **115.** 85 km/h **116.** $\frac{3}{2}$ m or 1.5m

117. Rs. 77,000 **118.** 16 pieces **119.** 28 **120.** 1920

121. Rs 864, Rs 720, Rs 432

122. Rs 32,000, Rs 12,000, Rs 16,000

123. Associative and commutative property.

124. (i) Commutative property.
(ii) Distributive property of multiplication over addition.
(iii) Associative property.
(iv) Additive identity of rational number.
(v) Multiplicative identity of rational number.

125. (i) $\frac{-8}{9}$ (ii) $\frac{3}{10}$ **126.** $\frac{13}{16} > \frac{5}{8} > \frac{1}{4}$

127. $\frac{-2}{3}$ **128.** $\frac{20}{21}$ **129.** –39 **130.** $\frac{7}{5}$

131. No. **132.** $\frac{1}{6}, \frac{2}{6}, \frac{3}{6}, \frac{4}{6}, \frac{5}{6}$ **133.** $\frac{1}{5}$ and $\frac{-1}{5}$

134. 12 **135.** $\frac{11}{24}$m **136.** $\frac{8}{7} > \frac{2}{5} > 0 > \frac{-9}{8} > \frac{-3}{2}$

137. (i) 0 (ii) $\frac{1}{2}$ **138.** 3.2°F **139.** $\frac{-48}{7}$ or $-6\frac{6}{7}$

140. –1 **141.** a) $\frac{19}{10}$m b) $\frac{209}{100}$m

142. 7; $\frac{75}{32}$sqm or $2\frac{11}{32}$sqcm **143.** $\frac{3}{8}$cup

144. a) $\frac{3}{160}$km b) $\frac{13}{200}$km c) Nancy

145. a) $58\frac{1}{2}$km b) $117\frac{1}{3}$km

146. (a) Less than (b) Paper Glass

(c) More $\frac{1}{2}$ (d) Paper > Glass > Scrap > Aluminium cans

147. $97\frac{7}{25}$cm, $98\frac{4}{9}$cm, $98\frac{1}{25}$cm, $97\frac{47}{50}$cm

$97\frac{7}{25}\text{cm} < 97\frac{47}{50}\text{cm} < 98\frac{1}{25}\text{cm} < 98\frac{4}{9}\text{cm}$ **148.** $\frac{2}{5}$m

149. May : $2\frac{1731}{2500}$, June : $\frac{381}{625}$, July : $-6\frac{568}{625}$, August : $-8\frac{159}{250}$

150. AP : $\frac{616}{10} = \frac{308}{5}$, Assam : $\frac{571}{10}$, Bihar : $\frac{607}{10}$,

Gujarat : $\frac{619}{10}$, Haryana : $\frac{641}{10}$, HP : $\frac{651}{10}$,

Karnataka : $\frac{624}{10} = \frac{312}{5}$, Kerala : $\frac{706}{10} = \frac{353}{10}$, MP : $\frac{565}{10} = \frac{113}{2}$,

Maharashtra : $\frac{645}{10} = \frac{129}{2}$, Orissa : $\frac{576}{10} = \frac{283}{5}$, Punjab : $\frac{669}{10}$

Rajasthan : $\frac{598}{10}=\frac{299}{5}$, Tamil Nadu : $\frac{637}{10}$, U.P. : $\frac{589}{10}$,

West Bengal : $\frac{628}{10}=\frac{314}{5}$

Kerala; Punjab; HP; Maharashtra; Haryana; Tamil Nadu; West Bengal; Karnataka; Gujarat; Andhra Pradesh; Bihar; Rajasthan; UP; Orissa; Assam; MP.

152. 39 cm **153.** Manavi : Rs 315, Kuber : Rs 84

(D) Games and Puzzles

1.

$\frac{32}{38}$	$\frac{18}{38}$	$\frac{4}{38}$	$\frac{-14}{-38}$
$\frac{-18}{-57}$	$\frac{-21}{-133}$	$\frac{24}{38}$	$\frac{104}{152}$
$\frac{22}{38}$	$\frac{70}{95}$	$\frac{25}{95}$	$\frac{-20}{-95}$
$\frac{1}{19}$	$\frac{-16}{-38}$	$\frac{45}{57}$	$\frac{60}{114}$

2.

Down 1: Rational
Down 2: Additive
Down 3: Commutative
Down 4: Reciprocal (or Inverse)
Down 5: Indefinitely
Down 6: Division
Down 7: 1
Down 8: Number
Across 1:infinite
Across 2: Associative
Across 3:Multiplication
Across 4: Natural
Across 5: Not defined
Across 6: Inverse

3. Riddle

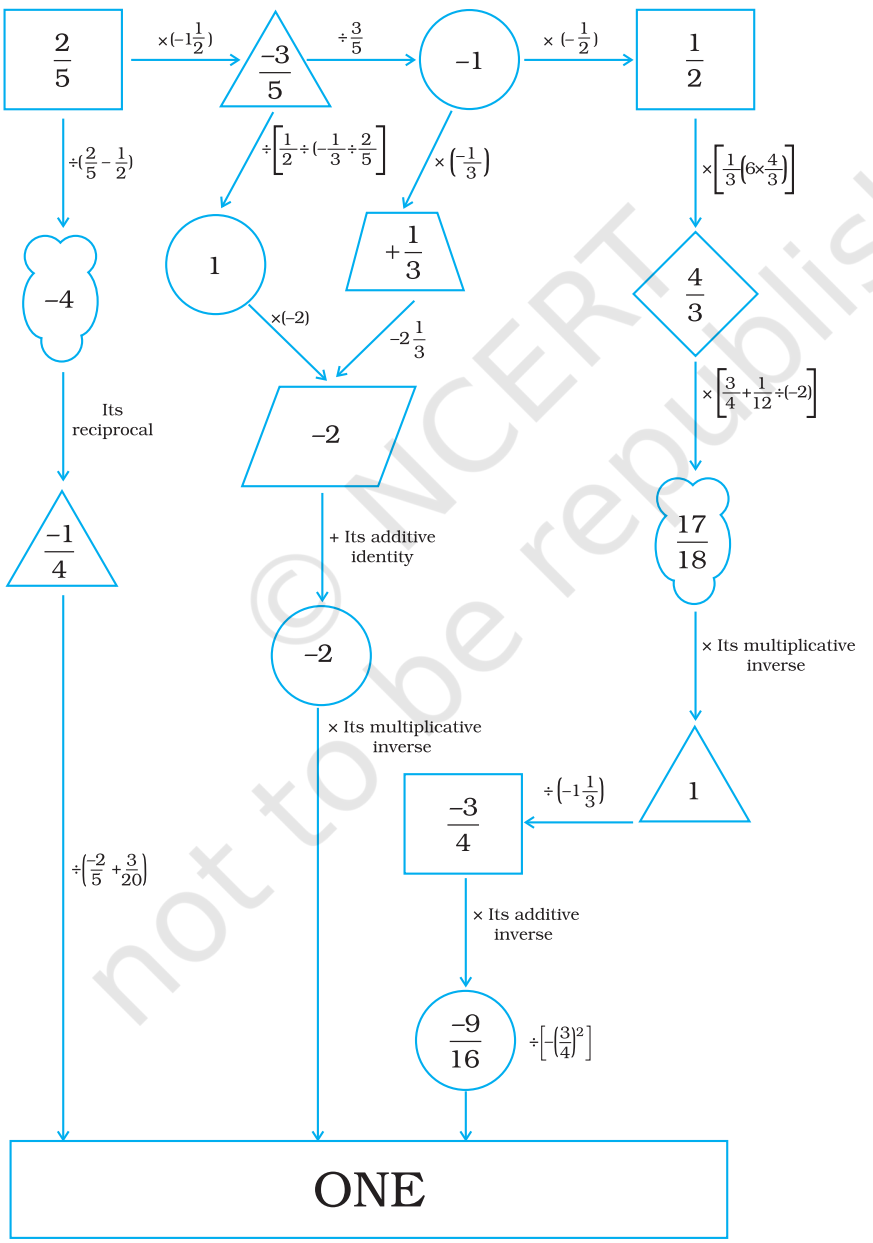
S.No.	Lowest Term	Word	S.No.	Lowest Term	Word
(1)	$\frac{-2}{5}$	S(P)IN	(4)	$\frac{-1}{3}$	(H)OST
(2)	$\frac{2}{3}$	T(Y)PE	(5)	$\frac{3}{10}$	SH(A)RP
(3)	$\frac{3}{4}$	WI(T)H	(6)	$\frac{1}{5}$	(G)AIN

3. Riddle

S.No.	Lowest Term	Word	S.No.	Lowest Term	Word
(7)	$\frac{4}{5}$	PRO(O)F	(9)	$\frac{1}{4}$	(A)WAY
(8)	$\frac{-1}{2}$	(R)AIN	(10)	$\frac{-1}{3}$	(S)WEET

P	Y	T	H	A	G	O	R	A	S
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

4.



Unit 2

1. (d) **2.** (a) **3.** (b) **4.** (c) **5.** (d) **6.** (b)

7. (b) **8.** (c) **9.** (c) **10.** (d) **11.** (b) **12.** (c)

13. (d) **14.** (d) **15.** (b) **16.** (c) **17.** (b) **18.** (a)

19. (a) **20.** (d) **21.** (d) **22.** (b) **23.** (b) **24.** (d)

25. (d) **26.** (c) **27.** (d) **28.** (d) **29.** (c) **30.** (d)

31. (c) **32.** (b) **33.** (d) **34.** (d) **35.** (c) **36.** Raw

37. 20 **38.** Upper class limit **39.** 19 **40.** Parts

41. Head, tail **42.** 1, 2, 3, 4, 5, 6 **43.** event

44. Random **45.** Size/Width **46.** 35-40

47. 40 **48.** 8 **49.** 22 **50.** 14 **51.** Frequency

52. Class Intervals **53.** 2 **54.** 5 **55.** Bars **56.** likely

57. X, Y **58.** 20-30 **59.** True **60.** False **61.** True **62.** True

63. True **64.** True **65.** True **66.** False **67.** True **68.** True

69. False **70.** False **71.** True **72.** False **73.** True **74.** False

75. False **76.** True **77.** False **78.** False **79.** True **80.** False

81. False **82.** a) 20 b) 60 c) 4 d) 20-30 e) 30-40 f) 10

84. a) 329 b) 168 c) 301 d) 2 hours or more

85. a) Bus b) $\frac{1}{4}$ c) 72 d) 6 e) car and Walk

86. a) $\frac{1}{2}$ b) $\frac{1}{6}$ c) $\frac{2}{6}$ or $\frac{1}{3}$ d) 0 e) $\frac{5}{6}$ f) $\frac{4}{6}$ or $\frac{2}{3}$

87. a) Certain to happen (b) May or may not happen
c)Certain to happen (d) Impossible to happen
e)Impossible to happen (f) May or may not happen

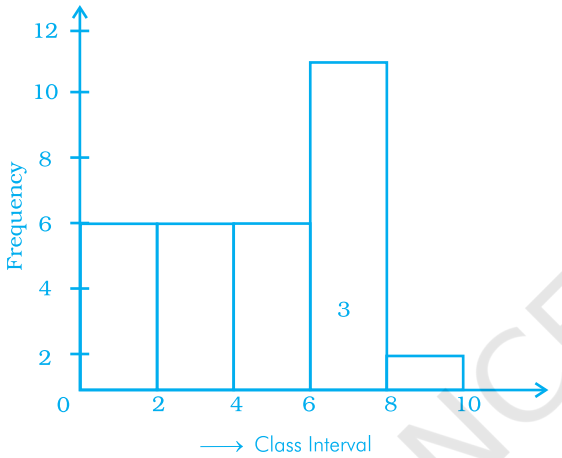
88. Mathematics 180, English 135, Social Science 30
Science 105, Hindi 90 **89.** 28

90. (a) 42 (b) 150-155 (c) 5 (d) 28

91.

Class interval	Tally marks	Frequency
0 – 2		0
2 – 4	𝍸 |	6
4 – 6	𝍸 |	6
6 – 8	𝍸 𝍸 |	11
8 – 10	||	2
	Total	**25**

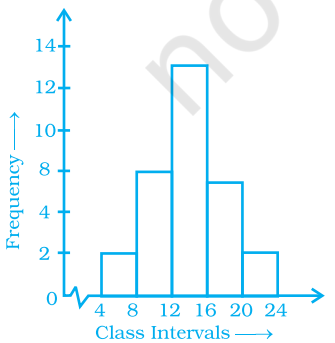
92.



93.

Class interval	Tally marks	Frequency
4 – 8	||	2
8 – 12	𝍸 | ||	8
12 – 16	𝍸 𝍸 |||	13
16 – 20	𝍸	5
20 – 24	||	2
	Total	**30**

94.

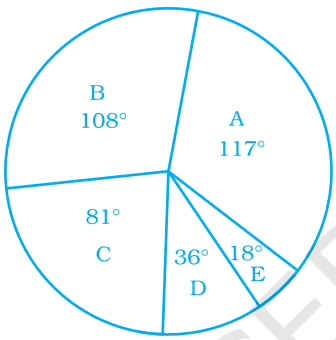


95.

Class interval	Tally marks	Frequency
25 – 30	||	2
30 – 35	𝍸 |||	8
35 – 40	𝍸 || 𝍸	10
40 – 45	𝍸 ||	7
45 – 50	|||	3
	Total	**30**

a) 25 - 30 b) 35 - 40

96.

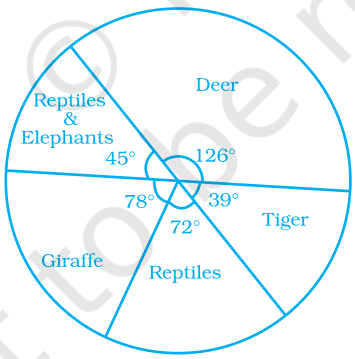


97. (i) 1 Crore

(ii) 2.5 times

(iii) $\frac{3}{10}$

98.



99. (a) $\frac{1}{8}$

(b) $\frac{4}{16}, \frac{4}{16}$

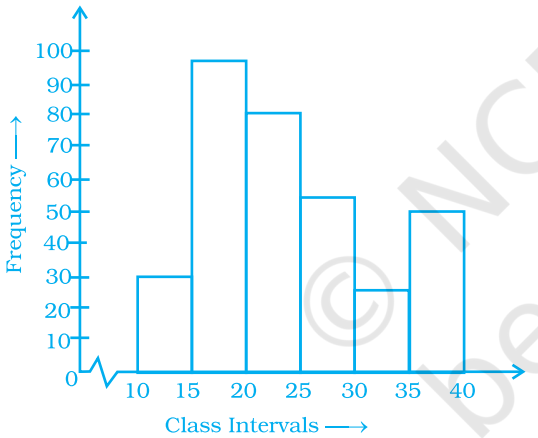
100.

Class interval	Tally marks	Frequency
30 – 35	|||	3
35 – 40	|||	3
40 – 45	|||	3
45 – 50	|||	3
50 – 55	𝍸	5
55 – 60	||||	4
60 – 65	𝍸	5
65 – 70	||	2
70 – 75	𝍸 ||	7
	Total	**35**

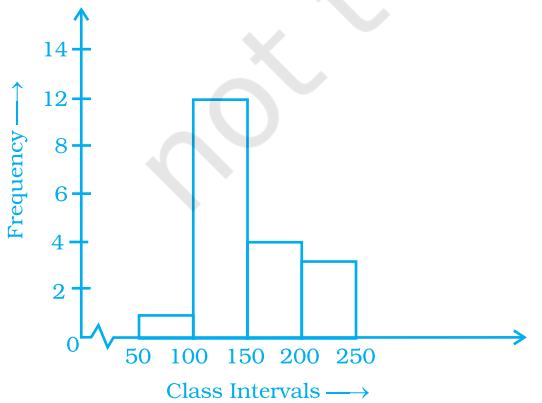
a) 9 b) 70 - 75

101. 12, 14, 06, 2, 1

102.



103.



104. a) 10-15, 15-20, 20-25, 25-30, 30-35, 35-40

b) 5

c) 10-15

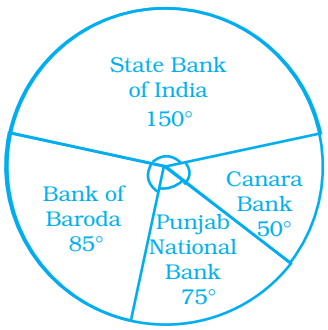
d) 15-20

105. a) 5

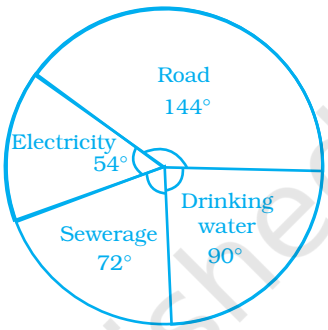
b) maximum experience 2, minimum experiences 5

c) 9

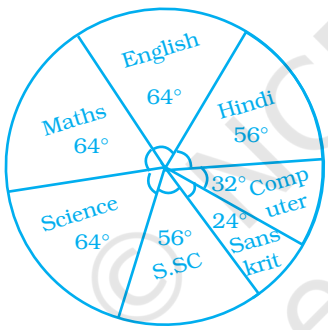
106.



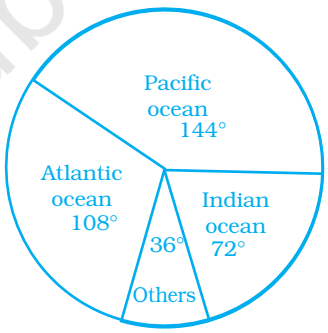
107.



108.



109.



110. (i) Cold drinks

(ii) 300

111. a) $\frac{1}{4}$ b) $\frac{3}{8}$ c) $\frac{7}{8}$

112. a) $\frac{1}{2}$ b) $\frac{3}{10}$ c) $\frac{1}{10}$ d) 0

113. a) 32% b) 28% c) 22% d) 18%

114. a) 32% Red b) 38% Yellow c) 30% Pink

115.

Housing	-Rs 15,000
Food	-Rs 10,000
Car loan	-Rs 12,500
Utilities	-Rs 5,000
Phone	-Rs 2,500
Clothing	-Rs 2,500
Entertainment	-Rs 2,500

116. a) Newspaper
b) Radio
c) 39%
d) 63%
e) Internet, Webmedia

(D) Application, Games and Puzzles

(I)	K	Q	J	10	9	8	7	6	5	4	3	2	A	Total
Spade	1	1	1	1	1	1	1	1	1	1	1	1	1	13
Heart	1	1	1	1	1	1	1	1	1	1	1	1	1	13
Diamond	1	1	1	1	1	1	1	1	1	1	1	1	1	13
Club	1	1	1	1	1	1	1	1	1	1	1	1	1	13
														52

1) 2 2) 52 3) 13 4) 4 Spade, Heart, Diamond, Club
5) 26 6) 26 7) 3 of each type 8) 12

9) (i) $\frac{6}{52}$ or $\frac{3}{26}$ (ii) $\frac{2}{52}$ or $\frac{1}{26}$ (iii) $\frac{1}{52}$

(iv) $\frac{12}{52}$ or $\frac{6}{26}$ or $\frac{3}{13}$ (v) $\frac{2}{52}$ or $\frac{1}{26}$ (vi) $\frac{2}{52}$ or $\frac{1}{26}$

(vii) 1 (viii) $\frac{3}{52}$ (ix) $\frac{1}{52}$

(x) $\frac{4}{52}$ or $\frac{1}{13}$ (xi) $\frac{13}{52}$ or $\frac{1}{4}$ (xii) $\frac{1}{2}$

(II) (a)

Outcomes	Sum	Outcomes	Sum	Outcomes	Sum
(1,5)	6	(4, 1)	5	(6, 3)	9
(1, 6)	7	(4, 2)	6	(6, 4)	10
(2, 1)	3	(4, 3)	7	(6, 5)	11
(2, 2)	4	(4, 4)	8	(6, 6)	12
(2, 3)	5	(4, 5)	9		
(2, 4)	6	(4, 6)	10		
(2, 5)	7	(5, 1)	6		
(2, 6)	8	(5, 2)	7		
(3,1)	4	(5, 3)	8		
(3, 2)	5	(5, 4)	9		
(3, 3)	6	(5, 5)	10		
(3, 4)	7	(5, 6)	11		
(3, 5)	8	(6, 1)	7		
(3, 6)	9	(6, 2)	8		

(b)

Sum of Dots	Tally Marks	No. of Outcomes	Probability
1	0	0	0
2	|	1	$\frac{1}{36}$
3	||	2	$\frac{1}{18}$
4	|||	3	$\frac{1}{12}$
5	||||	4	$\frac{1}{9}$
6	𝍸	5	$\frac{5}{36}$
7	𝍸|	6	$\frac{1}{6}$
8	𝍸	5	$\frac{5}{36}$
9	||||	4	$\frac{1}{9}$

10	||	2	$\frac{1}{12}$
11	||	2	$\frac{1}{18}$
12		1	$\frac{1}{36}$

(III) 1. A 卌 卌 卌 卌 卌 ||||

B |

C 卌 卌 卌

D 卌 ||||

E 卌 卌 卌 卌 卌 ||||

F 卌 |||

G 卌

H 卌 ||||

I 卌 卌 卌 ||||

J

K

L 卌 卌

M 卌 ||

N 卌 卌 卌 ||

O 卌 卌 ||||

P 卌

Q

R 卌 卌 卌

S 卌 卌 卌 |

T 卌 卌 卌 卌 卌 |

U 卌 |||

V ||||

W |

X |

Y |

Z |

2.	2 letters	𝍸 𝍸 𝍸 𝍸	20
	3 letters	𝍸 𝍸 𝍸 | | |	18
	4 letters	𝍸 𝍸 𝍸 | | |	18
	5 letters	𝍸 | | |	08
	6 letters	𝍸 | | | |	09
	more than 6 letters	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 | | |	33
			106

Crossword Answers

Across

1. Pie Chart
5. Five
7. Range
8. Event
9. Whole
10. One
12. Equal

Down

2. Histogram
3. Raw
4. Class Size
6. Frequency
11. Zero

Unit 3

1.	(c)	**2.**	(a)	**3.**	(c)	**4.**	(d)	**5.**	(b)	**6.**	(c)
7.	(b)	**8.**	(b)	**9.**	(c)	**10.**	(b)	**11.**	(b)	**12.**	(b)
13.	(b)	**14.**	(a)	**15.**	(b)	**16.**	(d)	**17.**	(b)	**18.**	(b)
19.	(a)	**20.**	(d)	**21.**	(b)	**22.**	(a)	**23.**	(c)	**24.**	(d)

25. 8 **26.** 8 **27.** 6 **28.** 4 **29.** 2n **30.** 3

31. 30.25 **32.** 5.3 **33.** 6 **34.** 10000 **35.** 1000000

36. 2 **37.** 0.49 **38.** 36 **39.** 9 **40.** 8, 15 **41.** 1.4

42. 1.728 **43.** odd **44.** $3\sqrt{x}$ or $x^{1/3}$ **45.** 5 **46.** 2

47. 2 **48.** 3 **49.** True **50.** False **51.** True **52.** True

53. False **54.** True **55.** False **56.** True **57.** False **58.** False

59. False **60.** False **61.** True **62.** True **63.** False **64.** False

65. False **66.** False **67.** False **68.** False **69.** True **70.** False

71. False **72.** True **73.** True **74.** False **75.** True **76.** False

77. False **78.** False **79.** True **80.** True **81.** False **82.** False

83. False **84.** False **85.** False **86.** False **87.** 1, 4, 9, 16, 25

88. 27, 216, 729 **90.** 1+3+5+7+9+11+13+15+17

91. a) 484 = $\underline{2 \times 2} \times \underline{11 \times 11}$; perfect square

b) 11250 = $2 \times \underline{3 \times 3} \times \underline{5 \times 5} \times \underline{5 \times 5}$; not a perfect square

c) 841 = $\underline{29 \times 29;}$ a perfect square

d) 729 = $\underline{3 \times 3} \times \underline{3 \times 3} \times \underline{3 \times 3;}$ a perfect square.

92. a) 128 = $\underline{2 \times 2 \times 2} \times 2 \times \underline{2 \times 2 \times 2;}$ not a perfect cube

b) 343 = $\underline{7 \times 7 \times 7;}$ a perfect cube

c) 729 = $\underline{3 \times 3 \times 3} \times \underline{3 \times 3 \times 3;}$ a perfect cube

d) 1331 = $\underline{11 \times 11 \times 11}$; a perfect cube

93. a) $101^2 = 10201$ b) $72^2 = 5184$ **94.** Yes, because $6^2 + 8^2 = 10^2$

95. (3, 4, 5) **96.** a) 105 b) 69 **97.** a) 8 b) 13

98. No, 11 **99.** No, 75 **100.** 3, 4, 5 and 5, 12, 13

101. 6; 6 **102.** 60; 60 **103.** a) 37 b) 75

104. a) 5.2 b) 1.2 **105.** 16; 37

106. 41, 79 **107.** 1024 **108.** 961 **109.** 3600

110. $\sqrt{50}$ or $5\sqrt{2}$ **111.** 7.2 **112.** 9.2 **113.** 22500 m^2

114. 16 **115.** 3,375 **116.** 82m **117.** 576 m^2

118. 8 cm **119.** 5, 10 and 15 **120.** 42.25 m^2

121. 4 **122.** 6 **123.** 32 **124.** 52

125. 104 **126.** 93 **127.** 37 m **128.** 3.3 m

129. 900 **130.** 8, 12, 20 **131.** 3600 **132.** $10\frac{1}{2}$ m

133. 18 **134.** 0.3, 0.45, 0.6 **135.** 3.6

136. 50,653 **137.** 85, 184

138. 8836 **139.** 6, 19, 30 **140.** 104 **141.** 196, 961

142. 12, 21, 102, 201

Cross Number Puzzle

[1]7	[2]3	6	1	[6]3
[3]2	[5]5	0	0	0
[4]9	[7]6	[10]7	1	2
6	2	5	[9]3	5
[11]1	5	1	[8]6	4

Unit 4

1. (c) **2.** (c) **3.** (c) **4.** (a) **5.** (b) **6.** (c)

7. (a) **8.** (c) **9.** (d) **10.** (a) **11.** (b) **12.** (c)

13. (a) **14.** (d) **15.** (a) **16.** highest **17.** 1

18. $\frac{6}{5}$ **19.** solution **20.** 3 **21.** 3, 4 and 5

22. Rs 16.50 **23.** sign **24.** 10 **25.** – 60 **26.** –24

27. 5 **28.** 7 **29.** 6 years **30.** $4x + 15 = 39$

31. $x + 9$ **32.** 100 **33.** False **34.** False **35.** False **36.** True

37. False **38.** True **39.** False **40.** False **41.** False **42.** False

43. False **44.** True **45.** False **46.** False **47.** False **48.** False

49. $x = 8$ **50.** $x = -2$ **51.** $x = 7$ **52.** $x = \frac{8}{3}$

53. $x = 0$ **54.** $x = \frac{31}{6}$ **55.** $y = \frac{17}{22}$ **56.** $x = -5$

57. $x = 2$ **58.** $x = 4$ **59.** $x = -6$ **60.** t = 0

61. $x = 7$ **62.** $x = 2$ **63.** $x = \frac{-12}{5}$ **64.** $x = 11$

65. $x = \frac{-8}{9}$ **66.** $x = 5$ **67.** $x = \frac{43}{35}$ **68.** t = 17

69. $y = \frac{1}{2}$ **70.** $x = 37$ **71.** $y = \frac{-37}{57}$ **72.** $x = \frac{1}{18}$

73. $x = \frac{-3}{17}$ **74.** $t = \frac{1}{3}$ **75.** $m = \frac{7}{5}$ **76.** $P = \frac{-5}{22}$

77. $x = -96$ **78.** $x = 18.3$ **79.** 24 flowers **80.** Rs 4500

81. 50*l*, 100*l* **82.** 800 **83.** 24 **84.** 18

85. 23 **86.** 52 **87.** 1200 **88.** 12, 42

89. 56 **90.** 9*m*, 23*m*, 23*m* **91.** 12 years

92. Rs 3,00,000 **93.** $\frac{7}{4}$ **94.** 65, 66, 67, 68

95. $14\frac{1}{3}$ kg **96.** $l = 80$ cm, $b = 40$ cm

97. A = 20 years, B = 15 years **98.** $\frac{1}{5}$ **99.** 36

100. 20 days **101.** 9 km/hr

102. 500 Rs notes: 150, 1000 Rs note: 25 **103.** 15

104. $\frac{9}{5}$ **105.** 10 days **106.** 100 **107.** 11 km/hr

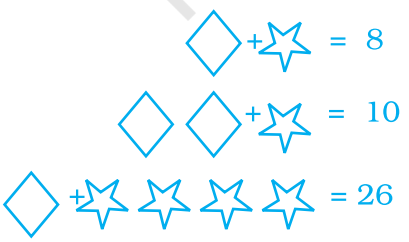
108. 22 km/hr, 30 km/hr **109.** 7 hr **110.** $x = 10$ cm

111. $x = 3$cm **112.** Rs 80, Rs 120 **113.** 40

Application, Games and Puzzles

1. (a) $x = 3$ (b) Y = 2 (c) Z = 2 (d) P = 1 (e) Q = 6 (f) R = 2

2.



3. (c) (i) $x = 6\frac{1}{2}$ (ii) $x = 1$ (iii) $x = 1$ (iv) $\frac{2}{7}$ (v) $x = 60$

(vi) $x = -5$ (vii) $x = \frac{-7}{5}$ (viii) $x = \frac{24}{5}$ (ix) $x = 5$ (x) $x = 42$

4. (1) $6\frac{1}{2}$ (2) 1 (3) -1 (4) $\frac{2}{7}$ (5) 60

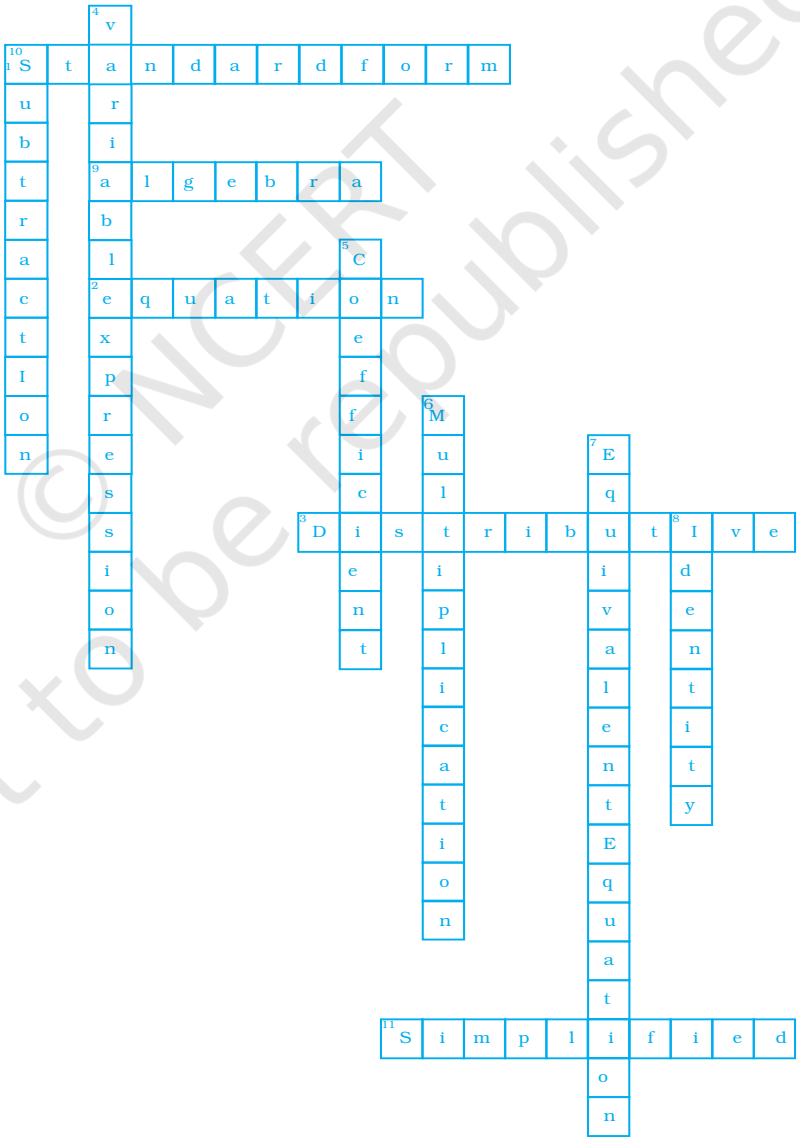
(6) -5 (7) $-\frac{7}{5}$ (8) $4\frac{4}{5}$ (9) 5 (10) 42

5. 1. Subtraction 2. Equation 3. Distributive

4. Variable expression 5. Coefficient 6. Multiplication

7. Equivalent equation 8. Identity 9. Algebra

10. Standard form 11. Simplified



Unit 5

1. (b)	**2.** (a)	**3.** (a)	**4.** (b)	**5.** (d)	**6.** (c)
7. (c)	**8.** (a)	**9.** (a)	**10.** (a)	**11.** (a)	**12.** (c)
13. (b)	**14.** (c)	**15.** (d)	**16.** (a)	**17.** (a)	**18.** (a)
19. (a)	**20.** (a)	**21.** (c)	**22.** (b)	**23.** (b)	**24.** (a)
25. (b)	**26.** (c)	**27.** (d)	**28.** (b)	**29.** (a)	**30.** (b)
31. (a)	**32.** (d)	**33.** (a)	**34.** (b)	**35.** (a)	**36.** (c)
37. (a)	**38.** (a)	**39.** (c)	**40.** (a)	**41.** (a)	**42.** (a)
43. (d)	**44.** (a)	**45.** (a)	**46.** (b)	**47.** (b)	**48.** (a)
49. (c)	**50.** (c)	**51.** (b)	**52.** (c)		

53. HO and EP, PO and EH

54. RO and OP, OP and PE, PE and ER, ER and RO

55. $\angle W$ and $\angle Y$, $\angle X$ and $\angle Z$ **56.** DF and EG

57. Angles	**58.** 72^0	**59.** 720^0	**60.** 20^0
61. 10^0	**62.** Concave Polygon		**63.** Kite
64. 108^0	**65.** An equilateral triangle		**66.** 9
67. Line segments		**68.** Angles	**69.** 2n–4
70. 360^0	**71.** Square	**72.** Trapezium	
73. Rhombus, Square		**74.** Right	**75.** 5
76. 2 included	**77.** All	**78.** 1	**79.** Opposite
80. 5	**81.** Parallelogram	**82.** 28cm	**83.** 9
84. Equal	**85.** Decagon	**86.** Square	**87.** 6cm
88. Supplementary		**89.** Kite	**90.** 80^0
91. Quadrilateral	**92.** False	**93.** True	**94.** False
95. True	**96.** False	**97.** False	**98.** True
99. True	**100.** False	**101.** True	**102.** True
103. True	**104.** False	**105.** False	**106.** False
107. False	**108.** False	**109.** False	**110.** False

111. True **112.** False **113.** False **114.** False

115. False **116.** False **117.** True **118.** True

119. True **120.** True **121.** True **122.** False

123. False **124.** True **125.** False **126.** True

127. True **128.** True **129.** True **130.** True

131. True **132.** 8.5cm **133.** 45^0, 135^0, 45^0, 135^0

134. Trapezium, Others are parallelogram **135.** 2 : 3

136. 36^0 **137.** No, in a rectangle diagonals are equal.

138. 70^0, 110^0, 70^0, 110^0

139. No, diagonals of a parallelogram bisect each other i.e. in the ratio 1:1.

140. 12 **141.** Parallelogram **142.** Rhombus

143. 23 cm, 30 cm, 30 cm **144.** 30^0, 60^0, 120^0

145. 55^0, 70^0, 70^0 **146.** 100^0, 80^0, 100^0

147. 120^0, 60^0, 15 cm, 11 cm, 12 cm, 52 cm **148.** 20^0, 20^0

149. 45^0, 75^0, 35^0 **150.** 70^0 **151.** 15^0 each

152. (i)Yes, opposite sides of a rectangle are equal.

(ii)Yes, MY and RX are perpendicular to OE.

(iii)Yes, these are alternate interior angles.

(iv)Yes, $\Delta MYO \cong \Delta RXE$

153. 50^0, 50^0, 50^0 **154.** 120^0 **155.** 90^0

156. 135^0, 45^0 **157.** 100^0 **158.** 2.5 **159.** 90^0

160. $x = 2$ **161.** $x = 10^0$, $y = 20^0$

162. $x = 80^0$, $y = 110^0$ **163.** $x = 80^0$

164. 105^0 each, Parallelogram **165.** 200^0, concave

166. 90^0 **167.** 135^0

168. Ext. angle of regular pentagon $= \frac{360^0}{5} = 72^0$

Ext. angle of regular decagon $= \frac{360^0}{10} = 36^0$

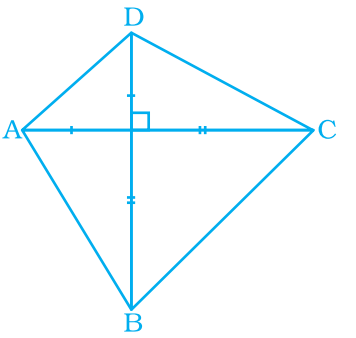
$72^0 = 2 \times 36^0$

169. 74^0 **170.** 80^0

171. Yes, $\frac{1}{2}\angle E + \frac{1}{2}\angle P = 180^0 - \angle PSE \Rightarrow \angle E + \angle P = 360^0 - 2\angle PSE$

and $\angle E + \angle P + \angle O + \angle H = 360^0$

$\Rightarrow 360^0 - 2\angle PSE + \angle O + \angle H = 360^0$



172. $x = 90^0$, $y = 60^0$, $z = 30^0$

173. False

Trap ABCD

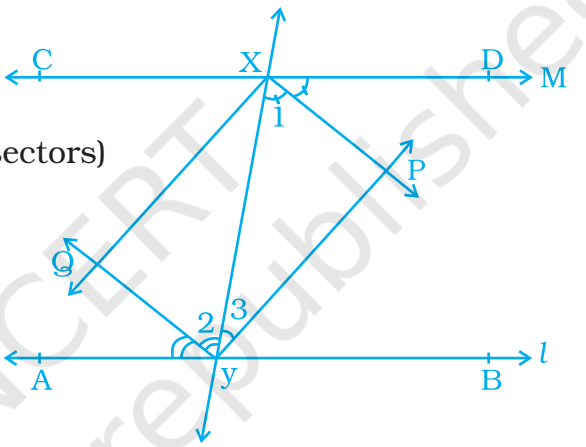
in which AD $\|$ BC

174. $\angle A = 120^0$, $\angle B = 105^0$, $\angle C = 75^0$, $\angle D = 60^0$

175. $l \| m$

$\angle DXY = \angle XYA$ (alt int. $\angle$S)

$\frac{\angle DXY}{2} = \frac{\angle XYA}{2}$ (÷2)



$\angle 1 = \angle 2$ (XP and YQ are bisectors)

$\therefore$ XP $\|$ QY (1)

Similarly XQ $\|$ PY (2)

From (1) and (2)

PXQY is a parallelogram

$\angle DXY + \angle XYB = 180^0$

$\frac{\angle DXY}{2} + \frac{\angle XYB}{2} = \frac{180^0}{2}$ (÷ by 2)

$\angle 1 + \angle 3 = 90^0$ (4)

In ΔXYP

$\angle 1 + \angle 3 + \angle P = 180^0$

$90^0 + \angle P = 180^0$ (from 4)

$\angle P = 90^0$

From (3) and (5), PXQY is a rectangle

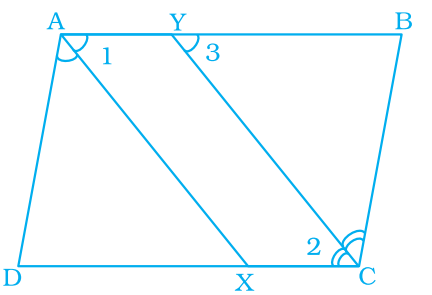
176. $\angle A = \angle C$ (opp. Ls of a $\|^{gm}$)

$\frac{\angle A}{2} = \frac{\angle C}{2}$ (÷2)

$\angle 1 = \angle 2$

But $\angle 2 = \angle 3$ (all $\angle$s)

$\therefore \angle 1 = \angle 3$



But they are a pair of corresponding ∠s

∴ AX || YC (1)

AY || XC (2) (AB || DC)

From (1) and (2)

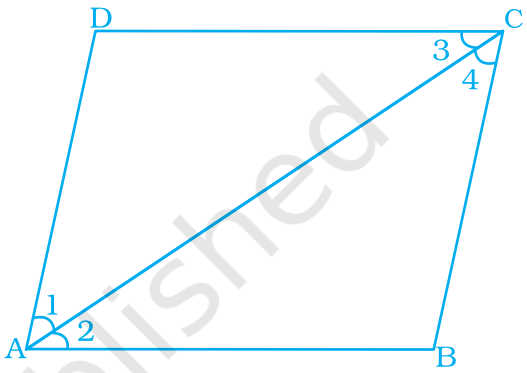
□AXCY is a Parallelogram

177. Given: (i) ABCD is a $\|^{gm}$

(ii) ∠1 = ∠2

To Prove: (i) ∠3 = ∠4

(ii) ABCD is rhombus



Proof: (i) ∠1 = ∠4

∠2 = ∠3 (alt ∠s)

But ∠1 = ∠2

∠3 = ∠4

(ii) ∠1 = ∠2 (given alt.)

∠2 = ∠3

∠1 = ∠3

Hence CD = DA

∴ ABCD is a rhombus

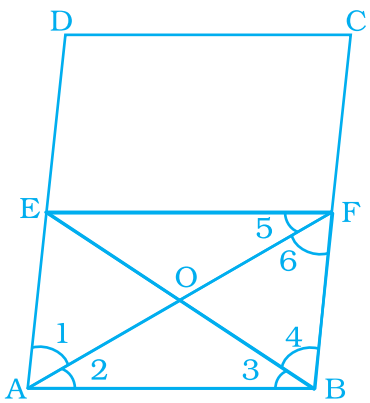
178. 135^0, 45^0, 135^0, 45^0

179. 60^0, 120^0, 60^0, 120^0

180. 45^0

181. Given: ABCD is a $\|^{gm}$, bisector of ∠A, bisects BC in F i.e. ∠1 = ∠2, CF = FB

Const: Draw FE || BA



Proof: ABFE is a $\|^{gm}$ by const. (FE || BA)

∠1 = ∠6 (alt. ∠)

But ∠1 = ∠2 (given)

∴ ∠2 = ∠6

AB = FB (1) (sides opp to equal ∠s)

∴ ABFE is a rhombus

In ΔABO and ΔBOF

AB = BF from (1)
BO = BO Common
AO = FO Diagonals bisect each other

$\Delta ABO \cong \Delta BOF$

$\angle 3 = \angle 4$

$BF = \frac{1}{2}BC$ (given)

$BF = \frac{1}{2}AD$ (BC = AD)

$AE = \frac{1}{2}AC$ (BF = AE)

$\therefore$ E is mid point of AD

182. 9^0

183. 3, 3, 3. So, maximum number of acute angles is always 3.

184. (a) 116^0

185. 30cm

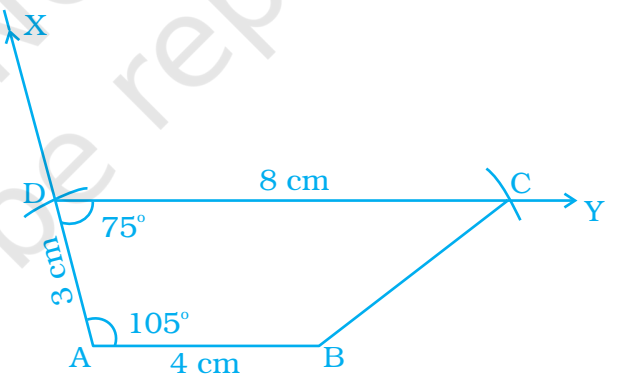
186. $\angle A + \angle D = 180^0$

$105^0 + \angle D = 180^0$

$\angle D = 75$

Steps of construction

1. Draw AB = 4 cm
2. Draw $\overline{AX}$ such that $\angle BAX = 105^0$
3. Mark a point D on AX such that AD = 3cm
4. Draw $\overrightarrow{DY}$ such that $\angle ADY = 75^0$
5. Mark a point C such that CD = 8cm
6. Join BC. ABCD is the required trapezium.

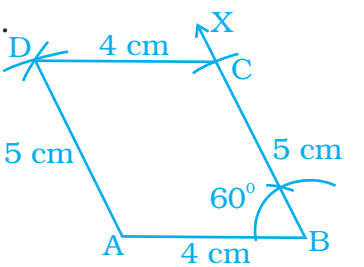


187. Opp sides of a ||gm are equal.

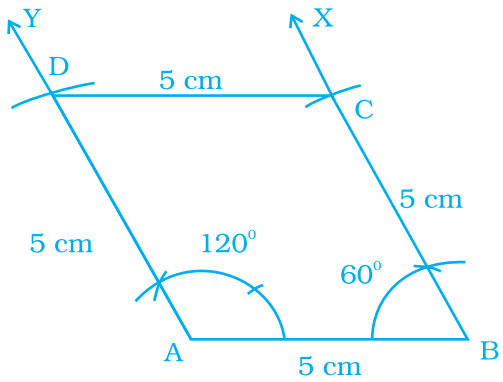
AB = DC = 4cm

BC = AD = 5cm

Steps of construction



1. Draw AB = 4 cm
2. Draw ray BX such that $\angle ABX = 60^0$
3. Mark a point C such that BC = 5cm
4. With C and A as centre, draw arcs intersecting at a point D respectively ABCD is the required parallelogram.



188. $\angle B = 60^0$ (suppose)

$\angle A + \angle B = 180^0$ (sum of co-interior angles)

$\angle A + 60^0 = 180^0$

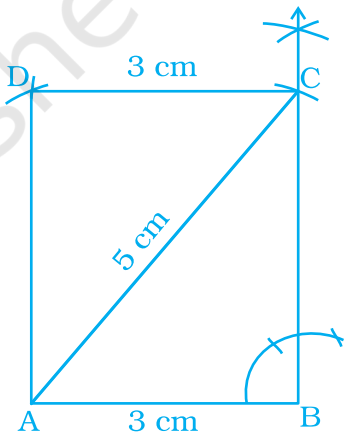
$\angle A = 120^0$

AB = BC = CD = DA = 5cm

Steps of construction

1. Draw AB = 5cm
2. Draw ray AY such that $\angle BAY = 120^0$
3. Mark a point D such that AD = 5cm
4. Draw ray BX such that $\angle ABX = 60^0$
5. Mark a point C such that BC = 5cm
6. Joint C and D

$\therefore$ ABCD is the required rhombus



189. Diagonals of a rectangle are equal.

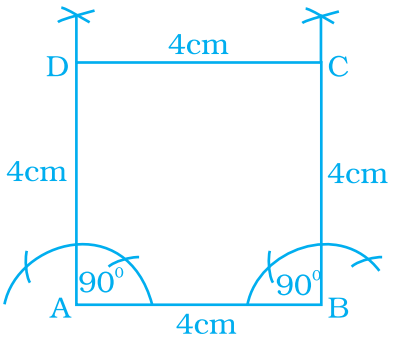
AC = BD = 5 cm

Steps of construction

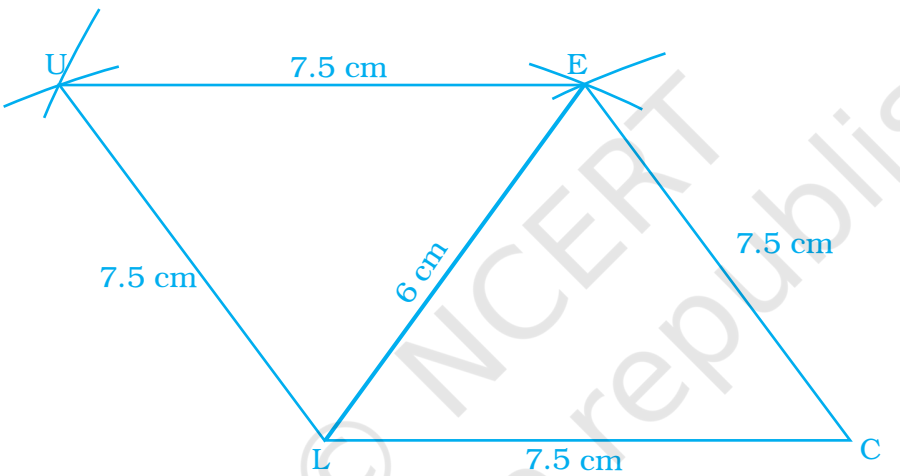
1. Draw AB = 3 cm
2. Draw a ray BX such that $\angle ABX = 90^0$
3. Draw an are such that AC = 5cm
4. With B as centre, draw an arc of radius 5cm. With C as centre draw another arc of radius 3cm which intersect first arc at a point, suppose D.
5. Join CD and AD

ABCD is the required rectangle.

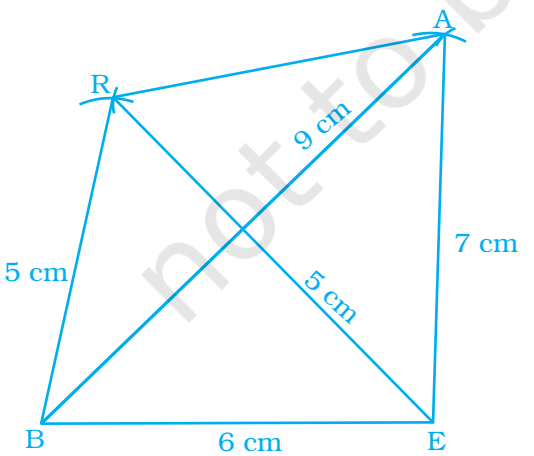
190.



191.



192.



RA = 5 cm

194. Cyclic quadrilateral

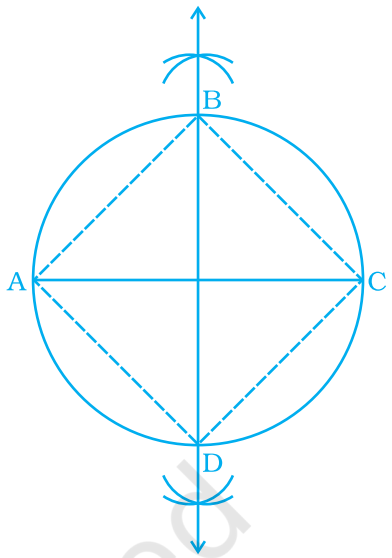
$\angle B = \angle D = 90^0$ (Angle in a semicircle)

$\angle A = \angle C = 90^0$

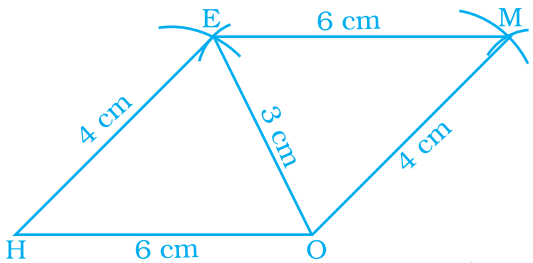
$\angle B + \angle D = 180^0$

$\angle A + \angle C = 180^0$

opposite $\angle$s are supplementary.



195.



196. No,

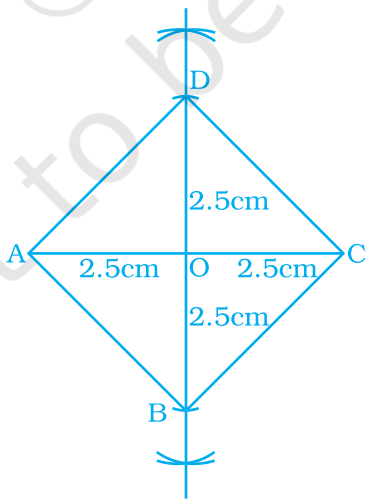
In a **Δ**, sum of two sides always is greater than the third side.

AB + BC $\not>$ AC

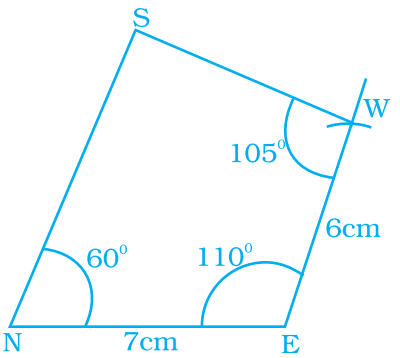
197. No,

$\angle O + \angle R + \angle A = 120^0 + 105^0 + 135^0 = 360^0$

198. Diagonals bisects at right angle



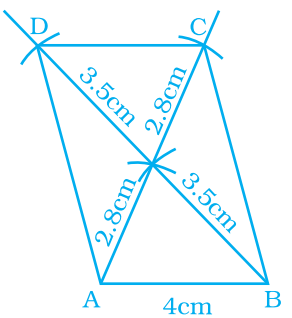
199.

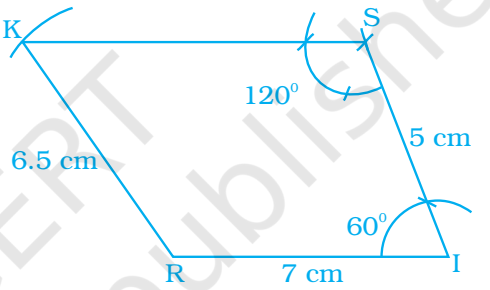


Fourth angle = $360^0 - (60^0+110^0+85^0)$

$= 360^0 - 255^0 = 105^0$

200.





Other side = 5 cm

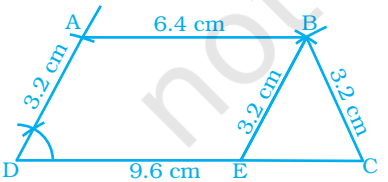
201. 72^0

202. $\angle I + \angle S = 180^0$

$60^0 + \angle S = 180^0$

$\angle S = 120^0$

203.



BEC is an equilateral triangle

$\angle A = 120^0$, $\angle B = 60^0$

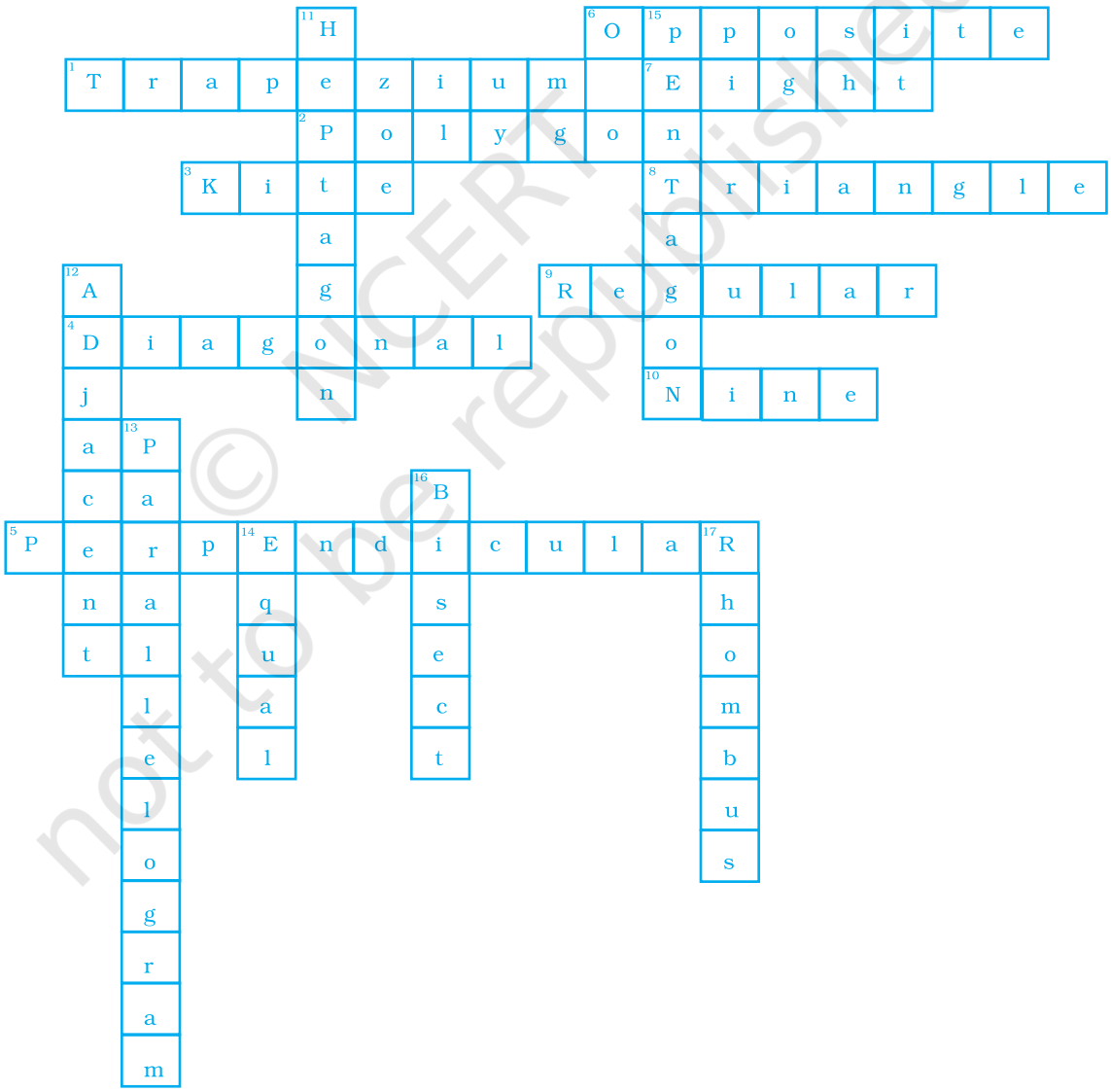
Application, Games and Puzzles

Across

1. Trapezium
2. Polygon
3. Kite
4. Diagonal
5. Perpendicular
6. Opposite
7. Eight
8. Triangle
9. Regular
10. Nine

Down

11. Heptagon
12. Adjacent
13. Parallelogram
14. Equal
15. Pentagon
16. Bisect
17. Rhombus



Unit 6

1.	(c)	**2.**	(a)	**3.**	(c)	**4.**	(a)	**5.**	(c)	**6.**	(d)
7.	(a)	**8.**	(c)	**9.**	(a)	**10.**	(a)	**11.**	(a)	**12.**	(b)
13.	(b)	**14.**	(b)	**15.**	(c)	**16.**	(d)	**17.**	(d)	**18.**	(b)
19.	(b)	**20.**	(d)	**21.**	(c)	**22.**	cube	**23.**	cuboid	**24.**	4
25.	n+1	**26.**	30	**27.**	Prism	**28.**	Cone	**29.**	Five	**30.**	Six
31.	Same	**32.**	4	**33.**	1:4400000			**34.**	7	**35.**	7
36.	top	**37.**	eight	**38.**	12	**39.**	Five	**40.**	Congruent		

41. a) ☐ Front view
☐ Side view
☐ Top view

b) i) Side view
ii) Top view
iii) Front view

c) i) Side view
ii) top view
iii) Front view

d) i) Side
ii) Front
iii) Top

42.	False	**43.**	False	**44.**	True	**45.**	False	**46.**	False	**47.**	False
48.	False	**49.**	False	**50.**	True	**51.**	False	**52.**	False	**53.**	True
54.	False	**55.**	True	**56.**	True	**57.**	False	**58.**	True	**59.**	True
60.	True	**61.**	True								

62. (a) 6, 8, 12, 14, 14,
(b) 4, 4, 6, 8, 8
(c) 5, 5, 8, 10, 10
(d) 5, 5, 8, 10, 10
(e) 6, 6, 10, 12, 12
(f) 7, 7, 12, 14, 14
(g) 5, 6, 9, 11, 11
(h) 6, 8, 12, 14, 14

(i) 6, 8, 12, 14, 14

(j) 7, 10, 15, 17, 17

(k) 10, 16, 24, 26, 26

(l) 9, 14, 21, 23, 23

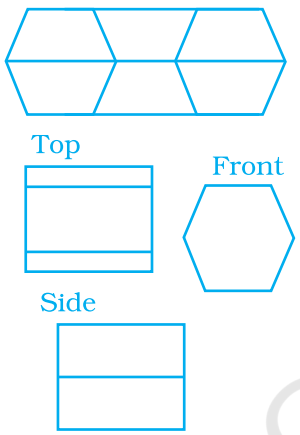
63. a) 4

b) 6

c) 9

d) 8

64.



65. (a) 1 (b) none (c) none

(d) 9 (e) 4 (f) 12

66. (a) 1 (b) 2 (c) none

(d) 16 (e) 18 (f) 9

67. (c), (f), (m) and (k) are not polyhedrons

68. (a) 10 (b) 10 (c) 10 (d) 9

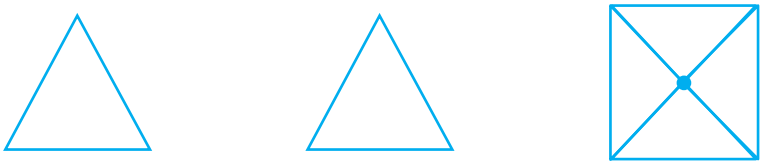
(e) 11 (f) 9 (g) 11 (h) 110

(i) 113 (j) 66 (k) 15 (l) 14

69. Front view Side view Top view

(a)

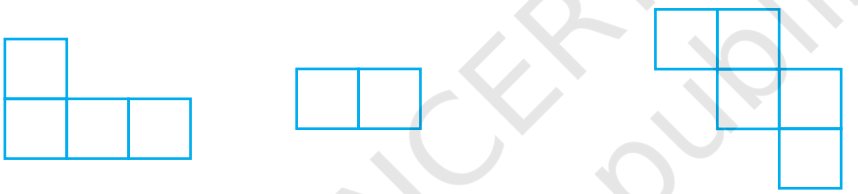
(b)



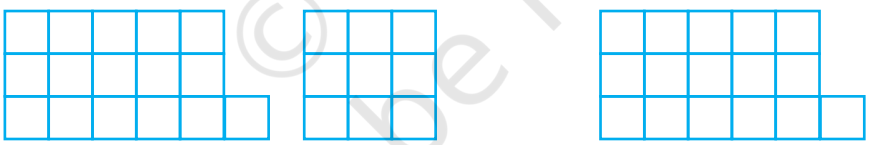
(c)

(d)

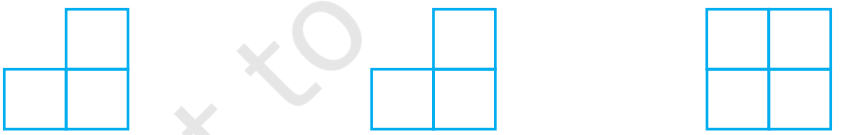
(e)



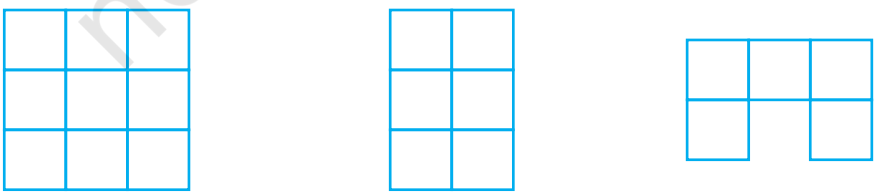
(f)

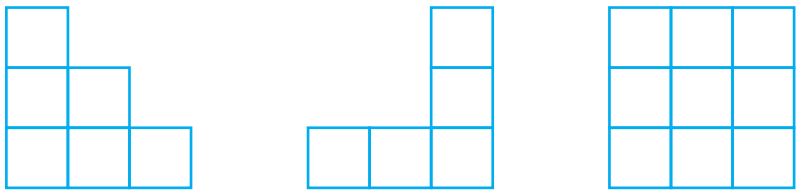


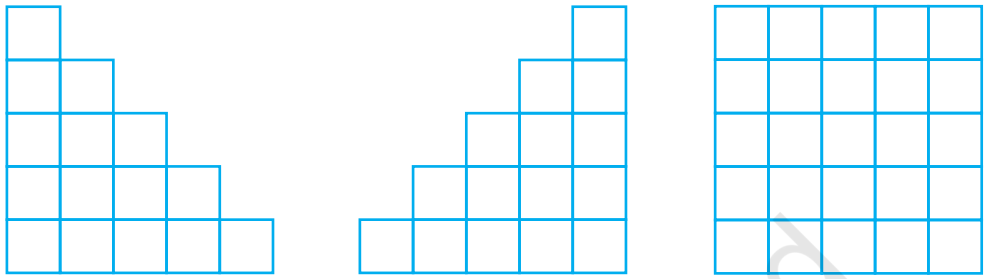
(g)



(h)



(i) 

(j) 

70. $x = 15$

$y = 8$

$z = 9$

$p = 8$

$q = 8$

$r = 17$

71. Yes, draw an octagonal pyramid.

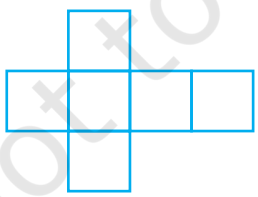
72. No.

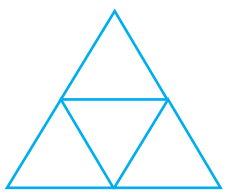
73. 22

74. (a) 14 (b) 10 (c) 16

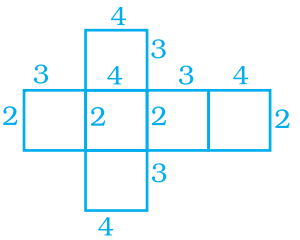
75. 30

76. 22

77. 

78. 

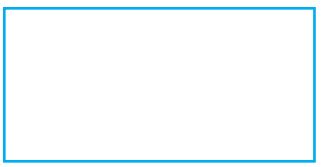
79.



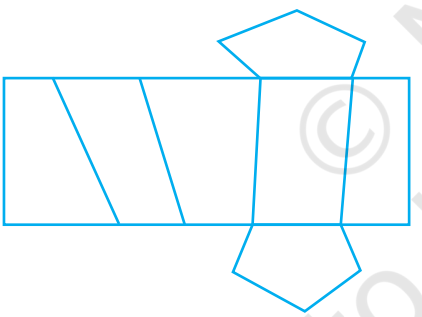
80. i) b
ii) d
iii) a
iv) c

81. 1. Prism, Pyramid
2. Pyramid
3. Cone, Cylinder
4. Prism, Pyramid
5. Cylinder, Prism
6. Pyramid
7. Cone

82.

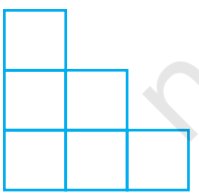


83.

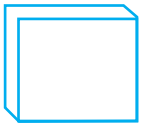


84. 7

85.



86. F = n+1
V = n+1
E = 2n

87. 

It is a cuboid. Yes.

88. a) Cylindrical mounted by hemi sphere.

b) Hexagonal prism mounted by a cone.

89. Cuboid

91. a) Cube

b) Cuboid

c) Cylinder

d) Cone

e) Square Pyramid

f) Triangular prism

92. a) 2.1 acre

b) Govt Model School I and II

c) Park A

d) B block

e) 6

93. a) AIIMS and Safdarjang Hospital

b) Sirifort Auditorium, Bhel, Asiad Tower

c) August Kranti Marg

94. a) Flower Road
Khel Marg, Mall Road
and Sneha Marg,

b) Stadium, Sector 27
B Town, B Town India

c) Sneha Marg

d) H.N.I, Nr. Bank
Sector 19, B Town India

e) Sector 27

f) Sector not mentioned

g) 3.

96. 1:2 **97.** 5:1 **98.** 25 km

99. 1) 60 km
2) 20 km
3) 35 km

100. 10 mm **101.** a) 1 cm = 4 m b) 1 inch = 9 feet

102. 12 cm

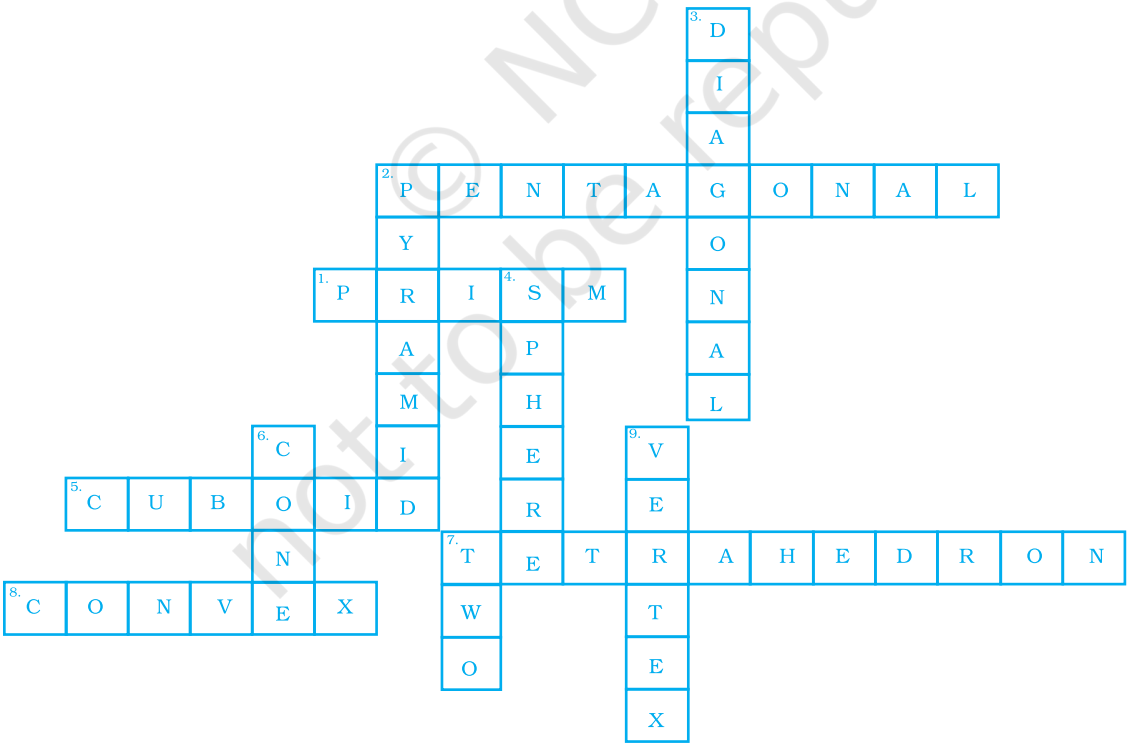
Activity, Crossword Puzzle

Across

1. Prism
2. Pentagonal
5. Cuboid
7. Tetrahedron
8. Convex

Down

2. Pyramid
3. Diagonal
4. Sphere
6. Cone
7. Two
9. Vertex



Unit 7

1. (b) **2.** (b) **3.** (b) **4.** (d) **5.** (d) **6.** (b)

7. (d) **8.** (a) **9.** (a) **10.** (b) **11.** (a) **12.** (b)

13. (d) **14.** (b) **15.** (c) **16.** (c) **17.** (b) **18.** (c)

19. (a) **20.** (b) **21.** (a) **22.** (c) **23.** (c) **24.** (a)

25. (c) **26.** (c) **27.** (b) **28.** (b) **29.** (d) **30.** (b)

31. (d) **32.** (c) **33.** (a) **34.** positive **35.** negative

36. $ab + ac$ **37.** $(a - b)^2$ **38.** $(a + b)(a - b)$

39. $2ab - 2b^2$ **40.** $a^2 + b^2$ **41.** ab **42.** polynomial

43. x **44.** $2m(9 + 5p)$ **45.** $(2y - 3)(2y - 3)$ **46.** $2x^2z$

47. $24\ xyz$ **48.** $(67 + 37)$ **49.** 205

50. $12\ x^2y^2$ **51.** $8x^3$ **52.** – 37 **53.** 2

54. $16\ (a^2 + b^2)$ **55.** distributive law **56.** $3y$ **57.** $x + 1$

58. $x + 2y$ **59.** False **60.** False **61.** True **62.** False

63. True **64.** True **65.** False **66.** False **67.** False **68.** True

69. False **70.** False **71.** False **72.** True **73.** False **74.** False

75. True **76.** True **77.** False **78.** True **79.** False **80.** True

81. i) $10a^2bc - abc^2$ ii) $10ax - 2by + 2cz$

iii) $4xy^2z^2 - 6x^2y^2z - 3x^2yz^2$ iv) $3x^2 + 2xy + 11y^2 + 4$

v) $-p^4 - 10p^3 - 2p^2 - 6p - 5$ vi) $3a^2 - ab + 3ac + 2bc - 2b^2$

vii) $6ab + 21ac + 6bc$

82. i) $-12a^2b^2c^2$ ii) $-9x^2 + 10xy + 3y^2$

iii) $2ab^2c^2 - 14a^2b^2c + 7a^2bc^2$ iv) $-7t^4 + 12t^3 - 6t^2 + 4t + 5$

v) $3ab - 7bc + 5ac + 10abc$ vi) $-33p^2 - 77\ pq$

vii) $-3ap - 3pr - 3pq - 3px$

83. i) $91p^4q^4r^4$ ii) $51x^3y^3z^3$ iii) $255xy^3z^2$ iv) $-715\ a^4b^3c^3$

v) $-15x^2y^2 + 3x^3y^2$ vi) ab^2c^2

vii) $7p^2qr - 7pq^2r + 7pqr^2$ viii) $x^3y^3z^2 - x^2y^3z^3 + x^3y^2z^3$

ix) $pq - 7p + 6q - 42$ x) 0 xi) a^{12} xii) $-91\ S^2t^3$

xiii) $21ab^{10}$ xiv) $-\frac{25}{3}r^4s^3$ xv) $a^4 - b^4$ xvi) $a^2b^2 + 2abc + c^2$

xvii) $p^2q^2 - 4pqr + 4r^2$ xviii) $\frac{1}{2}x^2 + \frac{17}{72}xy - 2y^2$

xix) $3p^4 - \frac{19}{6}p^2q^2 - 2q^4$ xx) $2x^3 - 3x^2 - 23x + 42$

xxi) $6x^4 - 4x^3 - 23x^2 + 44x - 24$ xxii) $2x^2 + 7x - 13y - 2y^2 - 15$

84. i) $18x^2 + 8y^2$ ii) $24xy$

iii) $\frac{49}{81}a^2 + ab + \frac{81}{49}b^2$ iv) $\frac{9}{16}x^2 + \frac{16}{9}y^2$

v) $7.2\ pq$ vi) $2.5m^2 + 4.5q^2$ vii) x^4

viii) $a^2b^2 + c^2$ ix) $-2b^3$ x) $b^3 - 49b + 7b^2$

xi) $40.5a^2 + 27ab + 4.5b^2$ xii) $p^2q^2 + 2pq^2r + q^2r^2$

xiii) $s^4t^2 - 2s^2t^2q^2 + t^2q^4$

85. i) $x^2y^2 + 2xy^2z + y^2z^2$ ii) $x^4y^2 - 2x^3y^3 + x^2y^4$

iii) $\frac{16}{25}a^2 + 2ab + \frac{25}{16}b^2$ iv) $\frac{4}{9}x^2 - 2xy + \frac{9}{4}y^2$

v) $\frac{16}{25}p^2 + \frac{8}{3}pq + \frac{25}{9}q^2$ vi) $x^2 + 10x + 21$

vii) $4x^2 + 4x - 63$ viii) $\frac{16}{25}x^2 + \frac{4xy}{5} + \frac{3y^2}{16}$

ix) $\frac{4}{9}x^2 - \frac{4}{9}a^2$ x) $4x^2 - 20xy + 25y^2$

xi) $\frac{4}{9}a^2 - \frac{b^2}{9}$ xii) $x^4 - y^4$

xiii) $a^4 + 2a^2b^2 + b^4$ xiv) $49x^2 + 70x + 25$

xv) $1296a^4 + 2401\ b^4 - 3528a^2b^2$ xvi) $0.81p^2 - 0.9pq + 0.25q^2$

86. i) 2704 ii) 2401 iii) 10609

iv) 9604 v) 1010025 vi) 990025

vii) 2491 viii) 2756 ix) 9975

x) 10088 xi) 10403 xii) 10094

xiii) 98.01 xiv) 99.96 xv) 103.02

xvi) 1050 xvii) 3860 xviii) 94

xix) 12800 xx) 89000 xxi) 458000

87. i) $18a$ ii) $3xy$ iii) y

iv) lmn v) $7pqr$ vi) ry

vii) $3xyz$ viii) $3prs$ ix) $13xy$

x) 1

88. i) $6b\ (a + 2c)$ ii) $-y\ (x + a)$ iii) $x\ (ax^2 - bx + c)$

iv) $lmn\ (lm + mn - ln)$ v) $3r\ (pq - 2p^2q^2r - 5r)$

vi) $xy\ (x^2y + xy^2 - y^3 + 1)$ vii) $2xy\ (2y - 5x + 8xy + 1)$

viii) $a\ (2a^2 - 3ab + 5b^2 - b)$

ix) $3pqrs\ (21pqr - 3qrs + 5prs - 20pqs)$

x) $xyz\ (24\ xz^2 - 6y^2z + 15xy - 5)$ xi) $(a + 1)\ (a^2 + 1)$

xii) $(x + y)\ (l + m)$ xiii) $x\ (a^2 - x^2)\ (a + x)$

xiv) $(x + 2y)\ (2x - 1)$

xv) $(y - 4z)\ (y - 2x)$ xvi) $x\ (ax + by)\ (y - z)$

xvii) $(a^2 + a + bc)\ (b + c)$ xviii) $(2a + 3b)\ (x + y)^2$

89. (i) $(x + 3)\ (x + 3)$ (ii) $(x + 6)\ (x + 6)$ (iii) $(x + 7)\ (x + 7)$

(iv) $(x + 1)(x + 1)$

(v) $(2x + 1)(2x + 1)$

(vi) $(ax + 1)(ax + 1)$

(vii) $(ax + b)(ax + b)$

(viii) $(ax + by)(ax + by)$

(ix) $(2x + 3)(2x + 3)$

(x) $(4x + 5)(4x + 5)$

(xi) $(3x + 4)(3x + 4)$

(xii) $(3y + 5)(3y + 5)$

(xiii) $2x(x + 6)(x + 6)$

(xiv) $x(ax + b)(ax + b)$

(xv) $x^2(2x + 3)(2x + 3)$

(xvi) $\left(\frac{x}{2}+2\right)\left(\frac{x}{2}+2\right)$

(xvii) $\left(3x+\frac{y}{3}\right)\left(3x+\frac{y}{3}\right)$

90. (i) $(x - 4)(x - 4)$

(ii) $(x - 5)(x - 5)$

(iii) $(x - 7)(y - 7)$

(iv) $(p - 1)(p - 1)$

(v) $(2a - b)(2a - b)$

(vi) $(py - 1)(py - 1)$

(vii) $(ay - b)(ay - b)$

(viii) $(3x - 2)(3x - 2)$

(ix) $(2y - 3)(2y - 3)$

(x) $\left(\frac{x}{2}-2\right)\left(\frac{x}{2}-2\right)$

(xi) $y(ay - b)(ay - b)$

(xii) $\left(3y-\frac{2x}{3}\right)^2$

91. (i) $(x + 13)(x + 2)$

(ii) $(x + 5)(x + 4)$

(iii) $(x + 5)(x + 13)$

(iv) $(p + 1)(p + 13)$

(v) $(y + 7)(y - 3)$

(vi) $(y - 5)(y + 3)$

(vii) $(9 + x)(2 + x)$

(viii) $(x - 7)(x - 3)$

(ix) $(x - 12)(x - 5)$

(x) $(x + 11)(x - 7)$

(xi) $(y + 4)(y + 3)$

(xii) $(p - 15)(p + 2)$

(xiii) $(a - 20)(a + 4)$

92. (i) $(x - 3)\ (x + 3)$ ii) $(2x - 5y)\ (2x + 5y)$

iii) $(2x - 7y)\ (2x + 7y)$ iv) $3a^2b\ (b - 3a)\ (b + 3a)$

v) $7a\ (2y - 5x)\ (y^2 + 5x)$ vi) $(3x - 1)\ (3x + 1)$

vii) $25a\ (x - 1)\ (x + 1)$ viii) $\left(\frac{x}{3}-\frac{y}{5}\right)\left(\frac{x}{3}+\frac{y}{5}\right)$

ix) $2\left(\frac{p}{5}-4q\right)\left(\frac{p}{5}+4q\right)$ x) $(7x - 6y)\ (7x + 6y)$

xi) $y\left(y-\frac{1}{3}\right)\left(y+\frac{1}{3}\right)$ xii) $\left(\frac{x}{5}-25\right)\left(\frac{x}{5}+25\right)$

xiii) $\frac{1}{2}\left(\frac{x}{2}-\frac{y}{3}\right)\left(\frac{x}{2}+\frac{y}{3}\right)$ xiv) $\left(\frac{2}{3}x-\frac{3}{4}y\right)\left(\frac{2}{3}x+\frac{3}{4}y\right)$

xv) $xy\left(\frac{x}{3}-\frac{y}{4}\right)\left(\frac{x}{3}+\frac{y}{4}\right)$ xvi) $11xy\ (11x - y)\ (11x + y)$

xvii) $b^2\left(\frac{1}{6}a-\frac{4}{7}b\right)\left(\frac{1}{6}a+\frac{4}{7}b\right)$

xiv) $2ab\ (2a^2 - 2ab + b^2)$ xix) $(x - 1)\ (x + 1)\ (x^2 + 1)$

xx) $(y - 5)\ (y + 5)\ (y^2 + 25)$ xxi) $p\ (p - 2)\ (p + 2)\ (p^2 + 4)$

xxii) $(2x - 3)\ (2x + 3)\ (4x^2 + 9)$ xxiii) $(x - y)\ (x + y)\ (x^2 + y^2)$

xxiv) $(y - 3)\ (y + 3)\ (y^2 + 9)$

xxv) $(2x - 5y)\ (2x + 5y)\ (4x^2 + 25y^2)$

xxvi) $(a - 2b + c)\ (a - c)$ xxvii) $8\ xy\ (x^2 + y^2)$

xxviii) $(x - y)\ (x + y)\ (x^2 + y^2 + 1)$ xxix) $2a\ (2a - 1)\ (2a + 1)$

xxx) $\left(x-\frac{y}{10}\right)\left(x+\frac{y}{10}\right)$ xxxi) $(3x - 3y - 3)\ (3x + 3y + 3)$

93. (i) $x - 2$ and $x - 4$ (ii) $x - 1$ and $x - 2$ (iii) $x - 2$ and $x - 5$

(iv) $x + 20$ and $x - 1$ (v) $x + 5$ and $x + 4$

94. (i) $3x^2y$ (ii) $4\frac{xz^3}{y}$ (iii) $-17\,bc$

(iv) $\frac{11p^3q^3r^3}{xy^2z^3}$

95. (i) $r - 2pqr^2$ (ii) $\frac{-a}{d}x^2 + \frac{b}{d}x - \frac{c}{d}$ (iii) $x^2y^2 + xy^2 - y^3 + 1$

(iv) $\frac{qr}{z} - \frac{pr}{x} + r$

96. (i) $x - 9$ (ii) $x + 12$ (iii) $2x$

(iv) $3x - 2$ (v) $3\,(x + 4)$ (vi) $x - 2$

(vii) $x^2 + 25$

97. $2x + 3y$ **98.** $3x + 4y$ **99.** $x + 8$

100. $y - 4$ **101.** $x + 3$ **102.** $\frac{1}{2}n(n+1)$

103. $(x^2 + 25)\,(x - 5)$ **104.** $7xy\,(x^4 + y^4)$

105. Rs $x^2 + 8x + 16$; Rs 196

106. $4x^2 - 9$ sq. units; 391 sq. units **107.** $44\,(ab - b\,(-2ac))$

108. 100 **109.** 200 **110.** 225

111. 72 **112.** 12

114. (i) 62 (ii) 143 (iii) 12 (iv) 8

115. $3a^2 + ab + 7ac + 2b^2 - 6bc - 4c^2$

116. $-b^3 + 2b^2 + 7b - 8$; 16 **117.** 51

118. $\left(x+\frac{1}{x}\right)\left(x+\frac{1}{x}-3\right)$ **119.** $(p^2 + q^2 - pq)\,(p^2 + q^2 + pq)$

120. (i) 8 (ii) 300 **121.** $x\,(x^2 - x + 1)$

122. Side = 25 units; $x = 5$ **124.** $10x\,(2x + 1)$ sq. units

125. (i) – (b) (ii) – (c) (iii) – (a)

Unit 8

1. (c)	**2.** (a)	**3.** (b)	**4.** (a)	**5.** (c)	**6.** (c)
7. (a)	**8.** (c)	**9.** (c)	**10.** (a)	**11.** (a)	**12.** (b)
13. (a)	**14.** (b)	**15.** (c)	**16.** (b)	**17.** (d)	**18.** (d)
19. (b)	**20.** (d)	**21.** (c)	**22.** (b)	**23.** (a)	**24.** (d)
25. (a)	**26.** (d)	**27.** (c)	**28.** (a)	**29.** (c)	**30.** (a)
31. (b)	**32.** (c)	**33.** (b)	**34.** 10^{-10}	**35.** a^{-7}	**36.** 1

37. 1 **38.** $\frac{1}{2^6}$ **39.** 2^{-6} **40.** Negative

41. Positive **42.** 10^{-5} **43.** $\left(\frac{2}{13}\right)^{-36}$ **44.** $\frac{36}{22}$

45. 1 **46.** 1.0×10^{-8} **47.** 1.234×10^{7}

48. 3410000 **49.** 2394610 **50.** 6^{-2} **51.** 3^4 or 81

52. 3^{11} **53.** 0.0000003 **54.** equal **55.** 3.25×10^{10}

56. 8×10^{-9} **57.** 0.000000000^{23} **58.** 8^4

59. 2^{10} **60.** 12^{-2} or $\frac{1}{144}$ **61.** 6 **62.** 0

63. $\frac{1}{3^{-5}}$ **64.** 1 **65.** 49 **66.** False

67. True **68.** True **69.** False **70.** True

71. Flase **72.** Flase **73.** False **74.** False

75. False **76.** False **77.** False **78.** True

79. True **80.** False **81.** False **82.** True

83. True **84.** True **85.** True **86.** True

87. False **88.** False **89.** True **90.** True

91. (i) 100^{10} (ii) 2^5 (iii) $\left(\frac{1}{2}\right)^{-1}$

92. $\frac{1}{3^9}$ **93.** 2^{-8} **94.** $\left(\frac{3}{4}\right)^3$ and $\left(\frac{-3}{4}\right)^3$

95. $\left(\frac{4}{9}\right)^2$ and $\left(\frac{-4}{9}\right)^2$ **96.** (a) $\left(\frac{-2}{3}\right)^{-6}$ (b) 2^{-10}

97. – 128

98. (i) 29 (ii) $\frac{3^8}{2^7}$ (iii) $\frac{7^5}{10}z^2$ (iv) 2^{-10} or $\frac{1}{1024}$

99. (i) $x = -2$ (ii) $x = -1$ (iii) $x = 0$

100. 2.93×10^{-4} **101.** $(100)^9$ **102.** 1 **103.** 1

104. $\frac{49}{90}$ **105.** $x = 2$ **106.** 3.9×10^8

107. 5.678×10^{-6} **108.** 1.312×10^6

109. 6.0×10^9 **110.** 1.5×10^7 **111.** 5.913×10^9 km

112. 1.0×10^{-8} g **113.** 3.72×10^6 kg **114.** 1.25×10^{12}

115. (a) 1.673×10^{-24} gm (b) 2.2×10^{-8} cm

(c) 3.34×10^{-21} tons (d) 10^{12}

(e) 5.6×10^4 (f) 5.0×10^5

(g) 6.3072×10^7 sec (h) 5.0×10^8 cm^2

116. $x = -1$ **117.** $\frac{(-2)^7}{(3)^9}$ **118.** $n = 1$ **119.** $n = 9$

120. $625x^3$ **121.** 400 **122.** $n = 6$ **123.** 16 kg

124. (a) 2^{24} (b) 2^{48} **125.** B **126.** 2^8

127. (a)

Number of Hops	Distance Covered	Distance Left	Distance Covered
1.	$\frac{1}{2}$	$\frac{1}{2}$	$1-\frac{1}{2}$
2	$\frac{1}{2}\left(\frac{1}{2}\right)+\frac{1}{2}$	$\frac{1}{4}$	$1-\frac{1}{4}$
3	$\frac{1}{2}\left(\frac{1}{4}\right)+\frac{3}{4}$	$\frac{1}{8}$	$1-\frac{1}{8}$
4	$\frac{1}{2}\left(\frac{1}{8}\right)+\frac{7}{8}$	$\frac{1}{16}$	$1-\frac{1}{16}$
5.	$\frac{1}{2}\left(\frac{1}{16}\right)+\frac{15}{16}$	$\frac{1}{32}$	$1-\frac{1}{32}$
6.	$\frac{1}{2}\left(\frac{1}{32}\right)+\frac{31}{32}$	$\frac{1}{64}$	$1-\frac{1}{64}$
7.	$\frac{1}{2}\left(\frac{1}{64}\right)+\frac{63}{64}$	$\frac{1}{128}$	$1-\frac{1}{128}$
8.	$\frac{1}{2}\left(\frac{1}{128}\right)+\frac{127}{128}$	$\frac{1}{256}$	$1-\frac{1}{256}$
9.	$\frac{1}{2}\left(\frac{1}{256}\right)+\frac{255}{256}$	$\frac{1}{512}$	$1-\frac{1}{512}$
10.	$\frac{1}{2}\left(\frac{1}{512}\right)+\frac{511}{512}$	$\frac{1}{1024}$	$1-\frac{1}{1024}$

127. (b) $1-\left(\frac{1}{2}\right)^n$

(c) No, because for reaching 1, $\left(\frac{1}{2}\right)^n$ has to be zero for some finite n which is not possible.

128. (a)

x	1^x	2^x	3^x	4^x	5^x	6^x	7^x	8^x	9^x	10^x
1	1	2	3	4	5	6	7	8	9	10
2	1	4	9	16	25	36	49	64	81	100
3	1	8	27	64	125	216	343	512	729	1000
4	1	16	81	256	625	1296	2401	4096	6561	10000
5	1	32	243	1024	3125	7776	16807	32768	59049	100000
6	1	64	729	4096	15625	46656	117649	262144	531441	1000000
7	1	128	2187	16384	78125	279936	823543	2097152	4782969	10000000
8	1	256	6561	65536	390625	1679616	5764801	16777216	43046721	100000000
One digit of the Power	1	2,4, 8,6	3,9, 7,1	4,6	5	6	7,9, 3,1	8,4, 2,6	9,1	0

(b) (1) 6 (2) 1 (3) 3 (4) 5 (5) 0

(c) (1) 1 (2) 4 (3) 7 (4) 1

129. (a) Sun - 1.99×10^{30} Mercury - 3.3×10^{23}

Venus - 4.87×10^{24} Earth - 5.97×10^{24}

Mars - 6.42×10^{29} Jupiter - 1.9×10^{27}

Saturn - 5.68×10^{26} Uranus - 8.68×10^{25}

Neptune - 1.02×10^{26} Pluto - 1.27×10^{22}

Moon - 7.35×10^{22}

(b) Pluto < Moon < Mercury < Venus < Earth < Uranus < Neptune < Saturn < Jupiter < Mars.

(c) Venus

130. (a) Sun - 1.496×10^{8} Jupiter - 7.783×10^{8}

Mars - 2.279×10^{8} Mercury - 5.79×10^{7}

Neptune - 4.497×10^{9} Pluto - 5.9×10^{9}

Saturn - 1.427×10^{9} Uranus - 2.87×10^{9}

Venus - 1.082×10^{8}

(b) Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Nepute, Pluto.

131. (a) Lead (b) Titanium

(c) Hydrogen < Lithium < Titanium < Silver < Lead

132. 2.8968192×10^{12} m **133.** 2.543×10^{-2} m

134. 0.000000767 **135.** $9.1093826 \times 10^{-28}$ g

136. Six thousand one hundred million.

137. (a)

Generation	Ancestor
1	2
2	2^2
12	2^{12}

(b) 2^n

138. 1610 billion in a week or 1.61×10^{12}

83950 billion in an year or 8.395×10^{14}

139. 37.5 g **140.** (a) $\frac{1}{3^7}$ (b) 5 half lines

141. 1.3×10^{-15} m **142.** 5.0×10^{-2} m

144. 144 $\xrightarrow{\times 2^{-3}}$ 18 $\xrightarrow{\times 12^{-1}}$ $\frac{3}{2}$ $\xrightarrow{\times 3^{-2}}$ $\frac{1}{6}$

145. 1.15×10^{-5} days

146. (a) Bajra, Jawar, Rice

(b) Bajra 1.3×10^3

Jawar 1.26×10^6

Rice 3.6×10^3

Wheat 7.0×10^5

(c) 3.0×10^3 hectares

147. 40 cm

148. (a) ($\times 2^2$) and yes ($\times 5^2$) hooked together

(b) ($\times 4$) machine

149. 64 cm

150. (a) Two times

Total stretch is 10,000

(b) Five times

Total stretch 16,807

(c) Seven times

Total Stretch is 78,125

151. ($\times 4^3$), ($\times 8^2$), ($\times 2^6$) machines **152.** It will remain same.

153. (a) They do not change its length. (b) 1 **154.** 3 cm

155. (i) 1 cm (ii) $\frac{1}{8}$ cm or 0.125 cm **156.** $\frac{1}{9}$ cm **157.** 5

158. (a) ($\times 2$) (b) ($\times 2^2$) (c) ($\times \frac{1}{5}$)

159. (a) 2^9 (b) 100^{12} (c) 7^{61}

(d) 3^{2y} (e) 2^3 (f) $\left(\frac{1}{6}\right)^2$

160. (a) Yes, ($\times 7^5$) (b) No (c) No

(d) Yes, ($x\ (0.5)^5$) (e) Yes, ($x12^5$)

161. ($\times 6^3$) **162.** $5^2 \times 5^2$

163. (a) ($\times 2^0$) (b) ($\times 5^{-1}$) (c) 5 cm (change in question)

(d) 3 cm

164. (a) $2^2 \times 5^2$ (b) $3^2 \times 11^1$

(c) ($x37$) (d) 101×111

165. $x3^4$, $x9^2$ **166.** $x\left(\frac{1}{2}\right)^3$

167. $a \times 25$, $a \times 125$, $a \times 625$ **168.** $\times 125$

169.

	Machine		
Input length	x^2	x^{10}	x^5
0.5	1	5	2.5
3	6	30	15
7	14	70	35

170. Give them a 8×8 grid

Now find sum of each row, e.g. 1st row

$= 2^0 + 2^1 + 2^2 + 2^3 + 2^4 + 2^5 + 2^6 + 2^7$

$= 255$

2nd row

$= 2^8 + 2^9 + 2^{10} + 2^{11} + 2^{12} + 2^{13} + 2^{14} + 2^{15}$

$= 2^8 (2^0 + 2^1 + 2^2 + 2^3 + 2^5 + 2^6 + 2^7)$

$= 2^8 \times 255$

$= 256 \times 255$

$= 65280$

3rd row

$= 2^{16} \times 255$

$= 16711680$

$2^8 = 256$

$2^{16} = 2^8 \times 2^8$

$= 256 \times 256$

and so on

171. Diameter of sun is 100 times the diameter of earth)

172. 26.32×10^{29} kg **173.** 1492.16×10^8 m **174.** 2.7×10^8 sec

175. 3 **176.** $\frac{64}{27}$

177. (1) $x = -2$ (2) $x = -7$ (3) $x = 6$

(4) $x = 7$ (5) $x = -1$ (6) $x = 4$

178. (1) $\frac{3}{2}$ (2) $\frac{1}{2}$ (3) $\frac{1}{2}$ (4) 2

179. (1) $-\left(\frac{6}{11}\right)^4$ (2) $\left(\frac{-5}{7}\right)^3$ (3) $\left(\frac{-20}{63}\right)^2$ (4) $\left(\frac{5}{10}\right)^4$ *or* $\left(\frac{1}{2}\right)^4$

180. (1) $\frac{8}{15}$ (2) 0 (3) $\frac{28}{169}$ (4) 0

(5) $3^7 \times t^2$ (6) $(3t)^6$

Activities

Activity 1

Number of Cuts	Number of Ballots
1	2 (= 2^1)
2	4 (= 2^2)
3	8 (= 2^3)
4	16 (= 2^4)

(a) 2^n (b) 2^{40} (c) 9 cuts

(d)

Number of Cuts	Area (cm^2)
0	324
1	162
2	81
3	40.5
4	20.25
5	10.125
6	5.0625
7	2.53125
8	1.265625
9	0.6328125
10	0.3164062

Formula – $A \times 2^{-n}$ (changes made in question)

(e) 8192 cm^2

Activity 2

(a)

Number of Steps	Number of Ballots
1	3
2	3^2
3	3^3
4	3^4
5	3^5

(b) 3^{15}, 3^n (c) At least 11 steps

Unit 9

1. (a) **2.** (b) **3.** (b) **4.** (a) **5.** (c) **6.** (a)

7. (c) **8.** (b) **9.** (d) **10.** (b) **11.** (a) **12.** (c)

13. (c) **14.** (b) **15.** (a) **16.** (c) **17.** (c) **18.** (b)

19. (b) **20.** (c) 20.8% **21.** Discount **22.** 200 **23.** 1 : 10

24. Discount = M.P. – S.P. **25.** Discount = Discount % of M.P.

26. Sales tax **27.** $A = P\left(1+\frac{R}{100}\right)^{n}$ **28.** Sales tax = tax% of Bill amount

29. Conversion period **30.** Overhead expenses

31. Marked Price **32.** $A = P\left(1+\frac{r}{200}\right)^{2t}$

33. equal, denominator **34.** Rs 1,000

35. A = Rs 9331.20, CI = 1331.20 **36.** Rs 27,000

37. 10%, $1\frac{1}{2}$ years

38. $x+\frac{40}{100}x = 1,12,000$ (Let C.P. be x)

$$\frac{140x}{100} = 1,12,000$$

$$x = \frac{1,12,000^{800}}{\cancel{140}1} \times 100 = 8000$$

39. $\frac{20}{3}\%$ *or* $6\frac{2}{3}\%$ **40.** 100% **41.** Rs 364 **42.** Rs 10,000

43. 400% **44.** 300% **45.** Rs 199.50 **46.** True

47. False **48.** False **49.** True **50.** False

51. False **52.** False **53.** False **54.** True

55. False **56.** True **57.** True **58.** False

59. True **60.** False **61.** False **62.** False

63. True **64.** True **65.** False **66.** 840

67. 29.67 kg, 23.73 kg, 10.79 kg or 10.8 kg (approx.)

68. (a) Rs 5177.50 (b) Rs 1280.50 **69.** (a) Rs 500 (b) Rs 10,000

70. (a) 10% (b) 3% **71.** Rs 380 **72.** Increase 5.76 **73.** $\frac{50}{3}\%$

74. 3703 **75.** 3019.14

76. (a) 40% (b) $\frac{32}{3}\% = 10\frac{2}{3}\%$ (c) 20%

77. 55.84%, 2.23% **78.** (a) Rs 664.95 (b) Rs 1243.26

(c) Rs 2305.38 (d) Service Tax = Rs 6.29, Total = Rs 4219.88

79. (a) Rs 3,200 (b) Rs 43,200 (c) Rs 3,456 (d) Rs 46,656

80. (i) 57.55% (ii) 22.65% **81.** Rs 35 **82.** 12.5%

83. Bill amount Rs 582.01 **84.** 882.9 + 3% = Rs 909.39

85. (i) Rs 5,000 (ii) Rs 1,05,000 (iii) Rs 5,250 (iv) Rs 1,10,250

86. Gain 27.08% **87.** Rs 630 **88.** Rs 7,840 **89.** 7305.38

90. Rs 25,000 **91.** 7,00,000 **92.** 0% gain or no profit no loss

93. Petrol 10.96%, Diesel 6.09%, LPG 8.20%

94. A. 42.06% (increase) B. 15.94% (decrease)

C. 83.34% (decrease) D. 8.34% (decrease)

95. 18.027% or 18.03% **96.** Loss = 0.25%

97. 40% **98.** Rs 864 **99.** Rs 3561.60 **100.** 30%

101. Rs 18,400 **102.** Rs 800 **103.** Rs 1653.60, Rs 1620

104. Amount = Rs 10,75,840, Interest = Rs 51,840

105. Amount to be paid = Rs 3798.50

106. (a) (b) 690 mg (c) 120% (d) 3 : 7 **107.** Rs 90

108. At store A the game is less expensive.

109. (a) Rs 30.60 (b) Rs 59.40

110. (a) No 2 method will give a lower price.

(b) Method 1 : Rs 202.50, Method 2: Rs 190

(c) Method 1, because in this method actual discount is less.

111. Neelgiri apartments will be cheaper for the first two months by Rs 900.

112. 20% increase is on original amount (if original price is Rs 100 so increased price would be Rs 120) but 20% decrease is on increased amount (i.e. 20% of 120 would be Rs 24), so decreased amount would be 120-24 = 96. Hence decreased price is less than the original amount.

113. 1. 93.3%2. $\frac{3}{4}$ 2. SPF - 4

3. False, as according to the claim, for $\frac{3}{100}$ affect of UV rays

1 minute = $33\frac{1}{3}$ SPF

Affect $\neq$ 30 SPF claim

114. Rs 12,50,000

115. Original price = Rs 3.97 per kg. Reduced Price = Rs 3.38/kg

116. (1) 81.6 (2) 90.4 (3) 85 (4) 84

(5) 86.67 (6) 82.5 (7) 90 (8) 82

(9) 86.67 (10) 87 (11) 88.5

117. 91.43%

118. Minakshi must finish greater per cent of homework at home.

119. 36% **120.** 44.4% **121.** 37.52 kg **122.** 4.431 gram

123. He is finding what per cent is 5 of 32.

124. Brand 1 (X) has greater sales tax rate

Brand 1 : 7.14%

Brand II (Y) : 4.84%

Unit 10

1. (c) **2.** (d) **3.** (a) **4.** (d) **5.** (a) **6.** (a)
7. (a) **8.** (d) **9.** (d) **10.** (b) **11.** (c) **12.** (a)
13. (a) **14.** (c) **15.** (d) **16.** (b) **17.** directly
18. inversely **19.** direct, directly
20. inverse, inversely **21.** inversely **22.** x/y
23. directly **24.** inversely
25. 16/3h or 5 h 20 mins **26.** 300 **27.** 96
28. directly **29.** constant **30.** ab, constant
31. ratio **32.** product **33.** directly **34.** 9.6 km
35. $2\frac{1}{4}$ h or 2h 15 mins **36.** 90 cm **37.** $y = 8$
38. = **39.** $\frac{a_1}{a_2} = \frac{b_2}{b_1}$ **40.** 480 cm^2
41. 288 hrs **42.** 0.250 km **43.** False **44.** False
45. False **46.** False **47.** False **48.** False
49. True **50.** False **51.** False **52.** False
53. False **54.** True **55.** True **56.** False
57. False **58.** True **59.** True
60. (i) Inversely (ii) Direct (iii) Inverse (iv) Direct
(v) Direct
61. (i) Direct (ii) Direct (iii) Direct (iv) Direct
(v) Neither
62. (i) Direct (ii) Neither (iii) Inverse (iv) Direct
(v) Direct
63. $y = 30$ **64.** $x = 128$ **65.** $l = 40$ **66.** $x = 20$
67. $39\frac{3}{8}$ **68.** 448 person **69.** 540 words **70.** 96 km/h
71. (i) $\frac{l}{m}k$ (ii) $k = \frac{1}{3}$ (iii) $l = 11$ (iv) $m = 24$
72. Rs 9,000 **73.** 8.75 cm **74.** $x = 72$, $y = 45$
75. 280 m **76.** 60l **77.** (i) No (ii) Yes (iii) Yes

78. (i) $27/2 = p$, $36/13 = q$, $108/25 = r$

(ii) $x = 45$, $y = 7.2$, $z = 9$

(iii) $l = 12$, $m = 20/3$, $n = 12/5$

79. (i) Rs 540 (ii) 60 m **80.** 12 pumps **81.** Rs 4,800

82. 9 m **83.** 25 days

84. (i) mixture A, (ii) mixture D, (iii) mixture F, (iv) mixture G

Lightest blue shade in mixture D.

30 containers of blue colours

75 containers of white colours

85. Purple (=12), Blue (=20),White (=16)

Total = 12 + 20 + 16 = 48

Statement I : P : Total = 12 : 48 = 1 : 4

Statement II : B : Total = 20 : 48 = 5 : 12

Statement III : W : Total = 16 : 48 = 1 : 3

Statement IV : P : B : = 12 : 20 = 3 : 5

Statement IV : P : W : = 12 : 16 = 3 : 4

86. 5 sweets **87.** 11 cows **88.** 21 person **89.** 5 km

90. 9.00 A.M.

91. 1 - H, 2 - D, 3 - G, 4 - F

5 - C6 - A 7 - B 8 - E

92. 60 g **93.** 35 km **94.** 24.9 m $\left[\because \frac{x}{21} = \frac{9.5}{8}\right]$

95. Slowest elevator C (speed 13 m/sec)

Fastest elevator D (speed 17m/sec)

For elevator B, D distance = 2.29 km

For elevator C, D distance = 1.820 km

96. 37.5 m **97.** 5 cups **98.** Yes, $k = 1/4$

99. 0.6 secs **100.** p%

101. (a) 10 : 7 (b) 98 black keys (c) 7 : 17

102. Direct proportion, 120 km.

103. 1/2 cup quick cooking gas
1/6 cup bread flour
1/6 cup sugar syrup
1/2 tablespoon cooking oil
2/3 cup water
3/2 tablespoons yeast
1/2 tea spoon salt

104. 8 new teachers **105.** 125 miles

106. (a) Rs 425, (b) 480 posts

Across		Down	
1	Directly	2	Inverse
4	Unitary	3	Equivalent
5	Less	6	Constant
7	Proportion	7	Product
9	Decrease	8	Increases

Unit 11

1.	(c)	**2.**	(c)	**3.**	(b)	**4.**	(a)	**5.**	*(b)*	**6.**	(c)
7.	(d)	**8.**	(a)	**9.**	(b)	**10.**	(c)	**11.**	(c)	**12.**	(d)
13.	(c)	**14.**	(c)	**15.**	(a)	**16.**	(b)	**17.**	(c)	**18.**	(d)
19.	(c)	**20.**	(c)	**21.**	(a)	**22.**	(a)	**23.**	(c)	**24.**	(a)
25.	(c)	**26.**	(a)	**27.**	(c)	**28.**	(c)	**29.**	24	**30.**	None

31. $10a^2$ **32.** 4 times **33.** h^3, $6h^2$ **34.** $\frac{1}{4}$

35. 50% **36.** $\frac{\pi}{4}a^3$ **37.** πb^2 **38.** $\frac{1}{2}(h_1 + h_2)\, d$

39. Two times **40.** 3 **41.** rectangular, different

42. equal **43.** $2\pi rh$ **44.** $2\pi rh\,(h + r)$

45. $\pi r^2 h$ **46.** Diagonals **47.** Twice **48.** Equal

49. Volume **50.** Lateral **51.** 3 : 1 **52.** 36 : 1

53. True **54.** False **55.** False **56.** False

57. False **58.** True **59.** False **60.** False

61. False **62.** $\frac{1}{2}$ min or 30 sec. **63.** 15 m

64. 1,050 m^2 **65.** Rs 528

66. (1) 352.8m^2, 468.3 m^2 (2) 106.3 m^2, 102.80 m^2

(3) 13.35 m^2, 235.6 m^2

67. 10 m **68.** 26 min 24 sec **69.** 7 : 8

70. 84 m **71.** 302 m **72.** 32.4 cm **73.** 0.636 km

74. 0.264 km/hr **75.** 13 m **76.** 53000 sq. units

77. 30100 sq. units **78.** 432 m^2 **79.** 240 m^2

80. 600 m^2 **81.** 13046 cm^2 **82.** 72 cm^2 **83.** 199.5 cm^2

84. *228.85* cm^2 **85.** 88.28 cm^2

86. (a) $\frac{x^3}{2}$ (b) $6y^3$ **87.** 1 : 5 **88.** 1 : 2π

89. 43.12 m^3 **90.** r = 21 cm, h = 14 cm

91. V = 11440 cm^3, Weight = 91520 g

92. (a) double of the original (b) Half of the original

(c) One fourth of the original **93.** 27 times the original

94. h = 20 cm **95.** 13280 cm^2 **96.** 22.68m^3, 22680 l

97. 64 cubes **98.** 6752 cm^3 **99.** 45,000 m^3

100. 1390.72 cm^2 **101.** 0.78 m

102. 42038.857 **103.** 1400 cm^2 **104.** B Pipe **105.** 200 m^3

106. 1 day **107.** 1440 **108.** 1848 cm^2

109. 25 dm, 20 dm, 15 dm **110.** r = 0.07m, 0.44m^2

111. (a) 27 times (b) $\frac{1}{64}$ times **112.** V = 3850 cm^3, A = 110 cm^2

113. 445000 cm^2,= 44.55 l **114.** r = 8 cm, A = 603.428 cm^2

115. 11180400 cm^2, 11.180400 cm^2 **116.** 621600 l

117. 1000 **118.** h = 8 m, b = 10 m

119. 1 : 1 **120.** 6500 cm^3 **121.** 3 cm^2

122. 2016 cm^2 **123.** 2042 **124.** 401.2 cm^2

125. 70 cm **126.** 5082 cm^3, 3811.5 cm^3

Unit 12

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

7. d **8.** c **9.** c **10.** d **11.** line graph

12. graph **13.** pair of **14.** *y*-axis **15.** *x*-axis *y*-axis

16. plotting **17.** *x* **18.** *x*-axis **19.** 2 **20.** zero

21. 4 **22.** *x*-coordinate/abscissa **23.** (5, 4)

24. y-coordinate/ordinate **25.** origin **26.** True **27.** True

28. False **29.** False **30.** False **31.** True **32.** True **33.** False

34. True **35.** (1) d, (2) f, (3) e, (4) a, (5) b, (6) c

36. (a) ii (b) iii (c) i (d) v (e) vi (f) iv

37. (a) F (2, 0) (b) A (0, 4) (c) H (5, 1) (d) C (2, 6) (e) E (3, 3)

38. A (0, 7.5) B (4, 5) C (7.5, 2.5) D (11, 0) E (14.5, 6.5)
F (18, 9.5)

40. (a) (A, f) (b) (monkeys, elephants) (c) (o, e) (d) (c, c)

41. (a) 7, (b) 5 , 90 **42.** (a) 5 (b) 0 (c) 7

43. (a) Yes (b) No, square (c) No, triangle

44.

x	1	2	3	4
y	3	6	9	12

46. (a) Rs 70, (b) 5

47. (a) Uniform speed.

(b) Moves with uniform speed then comes to rest.

(c) Moves with non-uniform speed then slowly comes to rest.

48. (a)

x	0	1	2	3
y	1	4	7	10

(b)

x	0	2	4	6
y	–1	1	3	5

49. (a)

x	0	1	2	3
y	0	1	2	3

(b)

x	0	1	2	3
y	2	4	6	8

50. (a) 264 unit (b) r = 35 unit

51. (a) Maximum temp. in °C in the two consecutive weeks.

(b) First week (c) Wednesday (d) Friday

(e) 1st week - 37°C, 2nd week - 33°C

(f) Sunday (g) Wednesday

52. (a) April (b) March (c) April (d) 250 (e) 125 (f) 2/3

53. (a) Subjects marks obtained (out of 10) by Sania in two terms exams in class VIII.

(b) Maths (c) English & Maths

(d) English & Hindi (e) 6 (f) Same in boths (g) Test I Maths

54. (A) (1, 1) E (5, 1) I (4,4)

(B) (3, 0) F (6, 3) J (4, 5)

(C) (4, 2) G (5,5) K (3, 6)

(D) (2, 3) H (4, 3) L (2, 6)

(M) (1, 5) O (2, 4) Q (0, 5)

(N) (2, 5) P (1, 2)

55. (a) 10 am (b) 16 km (c) not travelling

(d) 40 km (e) 24 km (f) 2 pm

(g) 4 km/h, 0 km/h (h) 10 p.m.

56. (a) p = 6 (b) q = 4

57. (a) Maximum temp is 31°C in a week

(b) Sunday, 25° C (c) Wednessday

(d) Friday

58. (a) 240 km (b) 5 hours (c) 2 hours (d) 120 km

(e) Time and Distance graph

(f) P after 1 hour

R after 5 hours

Q after 3 hours

S after 6 hours

59. D (4, 4) **60.** D (3, 0) No **61.** (2, 2)

62. (a) Vendor A (b) Sunday (c) Saturday to Sunday

(d) Thursday (e) Tuesday & Wednesday

63. (a) 7°C (b) 6 a.m. (c) 3°C

(d) between 8 am to 9 am (e) between 8 am to 9 am

64. (a) 90 cm (b) 20 cm more (c) between 4 yrs to 6 yrs

65. Sneha made least progress between 25 minutes to 40 minutes

66. (a) E (0.5, 0.5) J (2, 1.5)

F (2, 2) K (8, 6)

G (4, 2) L (16. 6)

H (2.5, 0.5) M (10, 1.5)

68. (a) 0 - 20 sec. (b) 30 sec. (c) nearly 20°C

(d) It reaches 100°C at 50 sec. which is the maximum.

69. (a) line graph

(b) It represents the no. of people who visited a store at a particular time.

(c) 1 p.m. (d) less than 5 (e) 20

70. (a) 5.30 a.m. and ends at 6 p.m. (b) 12:30 hours

(c) forward (d) 3 hours

71. (a) 8:45 am for 15 minutes (b) faster (c) at 9.00 a.m.

(d) 10 km. (e) 10 km.

72. Graph 15 km. **73.** Graph

74. (a) 18 years, 17 years, (b) boys

75. (a) Time and distance

(c) 0 to 5 minutes and 5 to 10 minutes

76.

x	1	2	3	4	5
y	1.25	5	10	15	20

77. (a) highest 1990, lowest 2000 (b) 1996 (c) 4.7%

78. (a) pattern 1 2 3 4 5 6

toothpicks 4 7 10 13 16 19

(b) graph (c) pattern $y = 3x + 1$

(d)

x	7	8
y	22	25

(e) Yes

79. (a) $y = 3x - 1$

(b)

x	3	8
y	8	23

80. 1. Water, No 2. No. C (7, 5) D (5, 7) 3. (2, 7)

4. (6, 11) 5. (7, 3) (5, 5) 6. (7.5, 3) 2 km

7. (8.5, 3) 8. (6.25, 3)

9. (9, 4) (10, 4) (11, 5) 10. (7, 8) (8, 8) (9, 8) 11. (5, 3) (6, 2) (7, 2)

81. a) Makes it easy to understand the temp. change

b) Temp. increases up to 1:00 p.m. and then decreases

c) at 12 pm 19°C., at 8 pm 10°C.

82. a) E and F b) D c) B and F, C and E

d) C, D, E e) Yes f) A g) A and C

83. (a) Height and Weight

(b) D - Ostrich B - Donkey A - Crocodile C - Dog

84. a) True b) True c) True

d) True e) False

85. Side length of purple S 1 2 3 4 5 10 100

White Tiles b 4 8 12 16 20 40 400

(c) b = 45

86. Rows r 4 6 8

White Tiles 9 15 21

Purple Tiles 1 6 15

Activity

1. Bar graph
2. *y*-axis
3. Linear graph
4. Origin
5. Coordinates
6. Right
7. Abcissa
8. Axes
9. Graph
10. Cartesia
11. Line
12. Ordinate
13. Whole
14. Histogram
15. Gaps
16. Horizontal
17. *x*-axis

Unit 13

1. (c) **2.** (b) **3.** (c) **4.** (c) **5.** (c) **6.** (c)

7. (d) **8.** (b) **9.** (a) **10.** (d) **11.** (b) **12.** (a)

13. (c) **14.** (a) **15.** (c) **16.** (a) **17.** (b) **18.** 9

19. 1, 4, 7 **20.** 1 **21.** 11 **22.** 9 **23.** 11

24. A = 6, B = 3 **25.** A = 2, B = 4 (four) **26.** B = 7 **27.** $x = 0$

28. $a + c$ or 12 $(a + c)$ **29.** 11 **30.** $(a + c) - b$ **31.** 5

32. values, A = 3, B = 6 **33.** t 41 **34.** True **35.** False **36.** False

37. True **38.** True **39.** True **40.** True **41.** False **42.** True

43. False **44.** False **45.** $a = 3$ **46.** P = 6 and Q = 9 **47.** 12

48. 33033, 66066, 99099 **49.** A = 9, Z = 8, X = 1

50. A = 8, B = 1, C = 3 **51.** A = 6, B = 7, C = 1 **52.** A = 6, B = 9.

53. A = 5, B = 6, C = 7 **54.** A = 9, B = 1 **55.** A = 8, B = 9

56. A = 7, B = 8, C = 4 **57.** A = 2, B = 5 **58.** A = 9, B = 1, C = 8

59. A = 7, B = 2 **60.** A = 7, B = 2, C = 3, D = 1 **61.** A = 9

62. X = 8 **63.** k is either 0 or 3, 6, 9 **64.** $y = 5$ **65.** $x = 8$

66. 2 **67.** S = 8, L = 5, M = 9, G = 1 **68.** S = 6, M = 9, B = 1, U = 0

69. 96, 85, 74, 63, 52, 41, 30

70. (a)555555555 (b) 777777777 (c) 72 (d) 81

71. (i)P = 7, Q = 4 (ii) M = 7, L = 4 **72.** B = 4 **73.** A = 4

74. Least value of y is 0

Cross Number Puzzle

(A)	7	(F)	4
(B)	0	(G)	8
(C)	4	(H)	9
(D)	2	(I)	1
(E)	0	(J)	0

Activity

1. 3, 5, 9
2. 2, 3, 6, 9
3. 2, 5, 10
4. 2, 3, 6, 9, 11
5. 2, 4, 8