

## MATHEMATICS

**Class X Standard – State**  
**Solution to Set - 1**

### SECTION – A

#### Solutions to Multiple Choice Questions

Q.No	Ans.	Q.No	Ans.	Q.No	Ans.	Q.No	Ans.	Q.No	Ans.
1.	(2)	2.	(1)	3.	(3)	4.	(2)	5.	(4)
6.	(1)	7.	(2)	8.	(3)	9.	(4)	10.	(1)
11.	(2)	12.	(4)	13.	(3)	14.	(4)	15.	(1)
16.	(2)	17.	(3)	18.	(4)	19.	(1)	20.	(2)
21.	(4)	22.	(3)	23.	(1)	24.	(2)	25.	(3)
26.	(4)	27.	(1)	28.	(2)	29.	(3)	30.	(4)
31.	(1)	32.	(2)	33.	(3)	34.	(4)	35.	(1)
36.	(2)	37.	(3)	38.	(4)	39.	(1)	40.	(2)
41.	(3)	42.	(4)	43.	(1)	44.	(2)	45.	(3)
46.	(4)	47.	(1)	48.	(2)	49.	(3)	50.	(4)
51.	(1)	52.	(2)	53.	(3)	54.	(4)	55.	(1)
56.	(2)	57.	(3)	58.	(4)	59.	(1)	60.	( )

### SECTION – B

$$61. \frac{\sqrt{2}}{\sqrt{3}-\sqrt{2}} + \frac{\sqrt{3}}{\sqrt{3}+\sqrt{2}} = \frac{\sqrt{2}(\sqrt{3}+\sqrt{2}) + \sqrt{3}(\sqrt{3}-\sqrt{2})}{3-2}$$

$$\sqrt{6} + 2 + 3 - \sqrt{6} = 5$$

62. Total distance covered is 8 km + 8 km = 16 km (Both ways)

Let the speed of the boat be x km/h

Speed of boat down stream = (x + 2) km/h

Speed of boat upstream = (x – 2) km/h

Time taken down stream = Distance ÷ Speed =  $\frac{8}{x+2}$  hours

Time taken upstream =  $\frac{8}{x-2}$  hours

$$\Rightarrow \frac{8}{x+2} + \frac{8}{x-2} = \frac{5}{3} \left( 1 \text{ hour } 40 \text{ minutes} = \frac{5}{3} \text{ hours} \right)$$

$$\Rightarrow \frac{8(x-2)+8(x+2)}{x^2-4} = \frac{5}{3}$$

$$\Rightarrow \frac{16x}{x^2-4} = \frac{5}{3}$$

$$\Rightarrow 5(x^2-4) = 48x$$

$$\Rightarrow 5x^2 - 48x - 20 = 0$$

$$\Rightarrow 5x^2 - 50x + 20x - 20 = 0$$

$$\Rightarrow 5x(x-10) + 2(x-10) = 0$$

$$\Rightarrow (x-10)(5x+2) = 0$$

$$\Rightarrow x-10 = 0 \text{ or } 5x+2 = 0$$

$$\Rightarrow x = 10 \text{ or } \frac{2}{5} \text{ since speed cannot be negative, negative value is ignored.}$$

Speed of boat in still water = 10 km/h

63. In this case  $a = 4$   $r = 12 \div 4 = 3$

$$S_n = \frac{a(r^n - 1)}{r - 1}$$

$$\Rightarrow S_3 = \frac{4(3^3 - 1)}{3 - 1} = 52$$

$$S_6 = \frac{4(3^6 - 1)}{3 - 1} = 1456$$

$$\Rightarrow S_3 : S_6 = 52 : 1456 = 1 : 28$$

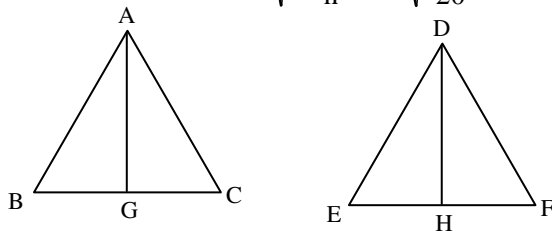
64.

Class Interval	f	x	fx	D x - X	D <sup>2</sup>	fd <sup>2</sup>
30-34	2	32	64	-10	100	200
35-39	5	37	185	-5	25	125
40-44	6	42	252	0	0	0
45-49	5	47	235	5	25	125
50-54	2	52	104	10	100	20
	$\sum f = 20$		$\sum fx = 840$			$\sum fd^2 = 470$

$$\text{Average} = \frac{\sum fx}{n} = \frac{840}{20} = 42$$

$$\text{Standard deviation} = \sigma = \sqrt{\frac{\sum fd^2}{n}} = \sqrt{\frac{470}{20}} = \sqrt{23.5} = 4.847$$

65.



Given :  $\Delta ABC$  is similar to  $\Delta DEF$

To prove :  $\frac{\text{Area } \Delta ABC}{\text{Area } \Delta DEF} = \frac{BC^2}{EF^2} = \frac{AB^2}{DE^2} = \frac{AC^2}{DF^2}$

Construction : Draw  $AG \perp BC$  and  $DH \perp EF$

Proof :  $\Delta ABC$  is similar to  $\Delta DEF \Rightarrow \frac{BC}{EF} = \frac{AB}{DE} = \frac{AC}{DF} \dots (1)$

Area of  $\Delta ABC = \frac{1}{2} \times BC \times AG \dots (2)$

Area of  $\Delta DEF = \frac{1}{2} \times EF \times DH \dots (3)$

$\Rightarrow \frac{\text{Area } \Delta ABC}{\text{Area } \Delta DEF} = \frac{BC \times AG}{EF \times DH}$  [From (2) and (3)]  $\dots (4)$

In  $\Delta ABG$  and  $\Delta DEH$

$\angle B = \angle E$   
 $\angle AGB = \angle DHE = 90^\circ$

$\Rightarrow \Delta ABG \sim \Delta DEH$

$\Rightarrow \frac{AB}{DE} = \frac{AG}{DH}$  But  $\frac{AB}{DE} = \frac{BC}{EF}$

Substituting in (4)

$\Rightarrow \frac{\text{Area } \Delta ABC}{\text{Area } \Delta DEF} = \frac{BC \times BC}{EF \times EF} = \frac{BC^2}{EF^2}$

Hence proved.

Similarly other two can be proved.

66.  $\frac{x^2}{yz} + \frac{y^2}{zx} + \frac{z^2}{xy}$   
 $= \frac{x^3 + y^3 + z^3}{xyz}$   
 $\Rightarrow \frac{3xyz}{xyz} (x^3 + y^3 + z^3 = 3xyz, \text{ when } x + y + z = 0)$   
 $\Rightarrow 3 = \text{RHS.}$

OR

$a^2 - b^2 - c^2 + 2bc$   
 $= a^2 - (b^2 + c^2 - 2bc)$   
 $\Rightarrow a^2 - (b - c)^2$   
 $\Rightarrow (a + b - c)(a - b + c)$   
 $\Rightarrow (2s - 2c)(2s - 2b)$  [ $a + b = 2s - c, a + c = 2s - b$ ]  
 $\Rightarrow 4(s - c)(s - b)$

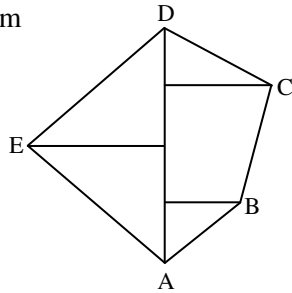


$$\Rightarrow x(x + 12) - 8(x + 12) = 0$$

$$\Rightarrow (x + 12)(x - 8)$$

$\Rightarrow x = 8$  or  $12$ . Since altitude can not be negative, altitude is  $8$  cm.

73. Scale  $1 \text{ cm} = 20 \text{ m}$



74. There are seven different book but particular books are always together

i.e., 1, 2, 3, 4 [5, 6, 7]  $n = 5$

$${}^5P_5 \quad {}^3P_3$$

Total number of ways that can arrange box =  ${}^5P_5 \times {}^3P_3$

$$= 5! \times 3! = 5 \times 4 \times 3 \times 2 \times 1 \times 3 \times 2 \times 1$$

$$= 120 \times 6 = 720 \text{ ways.}$$

75. Volume of the cylinder =  $\pi r^2 h$

Here volume =  $1000 \text{ cm}^3$  and radius  $7 \text{ cm}$

$$\Rightarrow 1000 = \frac{22}{7} \times 7 \times 7 \times h$$

$$\Rightarrow h = \frac{1000}{154} = 6.49 \text{ cm}$$

76. Euler's Formula =  $F + V = E + 2$

Number of faces in a triangular prism =  $5$

Number of Vertices =  $6$

Number of Edges =  $9$

$$F + V = 6 + 5 = E + 2 = 9 + 2$$

\* \* \*