

Bihar DELED Maths Questions Free PDF

Q1. Evaluate: $\sqrt{(961) \times 35 + 404 + 0.3\% \text{ of } 7200 + 289} = ?$

- (a) 1395.5
- (b) 1799.6
- (c) 2395.3
- (d) 2595

Q2. Evaluate: $? = 3.5 \times 5.5 + 1.5 \times 8.25 + 125.75$

- (a) 142.75
- (b) 157.375
- (c) 162.95
- (d) 168.05

Q3. The square root of which of the following is a rational number?

- (a) 1250.49
- (b) 6250.49
- (c) 1354.24
- (d) 5768.28

Q4. What is the sum of digits of the least number, which when divided by 15, 18 and 24 leaves the remainder 8 in each case and is also divisible by 13?

- (a) 17
- (b) 16
- (c) 15
- (d) 18

Q5. If the six-digit number $4x4y96$ is divisible by 88, then what will be the value of $(x + 2y)$

- (a) 13
- (b) 10
- (c) 12
- (d) 11

Q6. What is the sum of digits of the least number, which when divided by 15, 18 and 24 leaves the remainder 8 in each case and is also divisible by 13?

- (a) 17
- (b) 16
- (c) 15
- (d) 18

Q7. If $x^2 + \frac{1}{x^2} = 20$, then $x^3 - \frac{1}{x^3}$ is equal to:

- (a) $120\sqrt{2}$

- (b) $63\sqrt{2}$
- (c) $90\sqrt{3}$
- (d) $150\sqrt{2}$

Q8. If $x - \frac{1}{x} = 5\sqrt{5}$, then $x^3 - \frac{1}{x^3}$ is equal to:

- (a) $640\sqrt{5}$
- (b) $555\sqrt{5}$
- (c) $430\sqrt{5}$
- (d) $320\sqrt{5}$

Q9. If $3x + \frac{1}{2x} = 29$, then $9x^2 + \frac{1}{4x^2}$ is equal to:

- (a) 588
- (b) 644
- (c) 762
- (d) 838

Q10. If $a^3 - b^3 = 243$ and $a - b = 3$, then $a^2 + b^2$ is equal to:

- (a) 38
- (b) 41
- (c) 57
- (d) 67

Q11. If $a^2 - b^2 = 15$ and $a - b = 3$, then $a^2 + b^2 + 2ab$ is equal to:

- (a) 9
- (b) 16
- (c) 25
- (d) 27

Q12. If $a^3 - b^3 = 512$ and $a - b = 4$, then $a^2 + b^2 + ab$ is equal to:

- (a) 64
- (b) 96
- (c) 122
- (d) 128

Q13. If $\tan x = \cot (45^\circ + 2x)$, then what is the value of x ?

- (a) 45°
- (b) 15°
- (c) $\frac{45^\circ}{2}$
- (d) 20°

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Q14. The value of $\left[\frac{\sin^2 24^\circ + \sin^2 66^\circ}{\cos^2 24^\circ + \cos^2 66^\circ} + \sin^2 61^\circ + \cos 61^\circ \sin 29^\circ \right]$ is equal to

- (a) 2
- (b) 3
- (c) 1
- (d) 0

Q15. The value of $\frac{\sin 30^\circ - \cos 60^\circ + \cot^2 45^\circ}{\cos 30^\circ - \tan 45^\circ + \sin 90^\circ}$ is equal to

- (a) $\frac{2\sqrt{3}}{3}$
- (b) $\frac{\sqrt{3}}{2}$
- (c) $\frac{3}{2}$
- (d) $\frac{\sqrt{3}}{4}$

Q16. If $\tan 3x = \cot (30^\circ + 2x)$, then what is the value of x ?

- (a) 18°
- (b) 12°
- (c) 10°
- (d) 15°

Q17. The value of $\sin^2 30^\circ \cdot \cos^2 45^\circ + 2 \tan^2 30^\circ - \sec^2 60^\circ$ is equal to:

- (a) $-\frac{13}{12}$
- (b) $-\frac{77}{24}$
- (c) $-\frac{25}{12}$
- (d) $-\frac{1}{12}$

Q18. If $\sin(A + B) = \frac{\sqrt{3}}{2}$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$, then $(2A + 3B)$ is equal to:

- (a) 120°
- (b) 135°
- (c) 130°
- (d) 125°

Q19. The sides of a triangle are 10 cm, 24 cm and 26 cm. At each of its vertices, circles of radius 3.5 cm are drawn. What is the area of the triangle excluding the portion covered by the sectors of the circles?

$$\left(\pi = \frac{22}{7} \right)$$

- (a) 81.5 cm^2
- (b) 100.75 cm^2
- (c) 75.75 cm^2
- (d) 78.25 cm^2

Q20. One side of a rhombus is 6.5 cm and one of its diagonals is 12 cm. What is the area of the rhombus?

- (a) 78 cm^2
- (b) 15 cm^2
- (c) 30 cm^2
- (d) 60 cm^2

Q21. The length of diagonal of a square whose area is 64 m^2 is:

- (a) $4\sqrt{2} \text{ m}$
- (b) $8\sqrt{2} \text{ m}$
- (c) 8m
- (d) 4m

Q22. The area of each square of a chessboard having 64 equal squares is 4 cm^2 . If there is a border on all the sides of the chessboard of 2 cm, then the perimeter of the chessboard is :

- (a) 256 cm
- (b) 70 cm
- (c) 128 cm
- (d) 80 cm

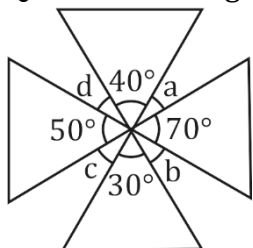
Q23. The perimeter of floor of a square room is 230 m and height of the room is 5 m. The cost of painting the walls of the room at Rs. 7.50 / m^2 is:

- (a) Rs. 3,450
- (b) Rs. 8,625
- (c) Rs. 4,312.50
- (d) Rs. 17,250

Q24. A diagonal of a quadrilateral is 40 cm. The length of the perpendiculars from opposite vertices is 7.5 cm and 8.6 cm. The area of the quadrilateral is:

- (a) 288 cm^2
- (b) 322 cm^2
- (c) 434 cm^2
- (d) 368 cm^2

Q25. Find average of angles a, b, c, d.



- (a) 170°
- (b) 180°
- (c) 42.5°
- (d) Can't be determined

Q26. If the sum and difference of two angles are 144° and $\frac{\pi}{15}$ respectively. Find the largest angle.

- (a) $\frac{5\pi}{12}$
- (b) $\frac{5\pi}{17}$
- (c) $\frac{13\pi}{30}$
- (d) $\frac{13\pi}{31}$

Q27. If $\Delta ABC \sim \Delta QPR$, $\frac{ar(ABC)}{ar(\Delta PQR)} = \frac{9}{4}$, $AC = 12$ cm, $AB = 18$ cm and $BC = 15$ cm, then PR is equal to:

- (a) $\frac{20}{3}$ cm
- (b) 12 cm
- (c) 8 cm
- (d) 10 cm

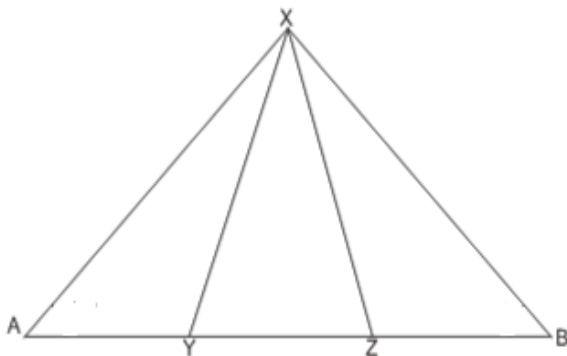
Q28. In ΔABC , $\angle A = 50^\circ$, Its sides AB and AC are produced to the point D and E . If the bisectors of $\angle CBD$ and $\angle BCE$ meet at the point O , then $\angle BOC$ is equal to:

- (a) 75°
- (b) 65°
- (c) 55°
- (d) 40°

Q29. In ΔABC , $\angle A = 30^\circ$. If the bisectors of the angle B and angle C meet at a point O in the interior of the angle, then $\angle OBC$ is equal to:

- (a) 105°
- (b) 75°
- (c) 90°
- (d) 120°

Q30. In the given figure, XYZ is an equilateral triangle. $\angle XAY = 40^\circ$, $\angle XBZ = 30^\circ$ then $\angle AXB$ is equal to:

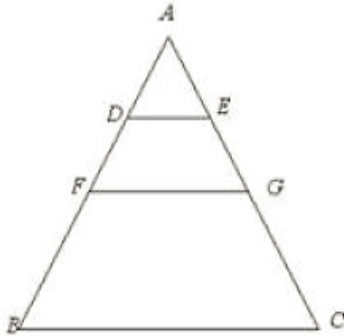


- (a) 90°
- (b) 110°
- (c) 60°
- (d) 80°

Q31. Triangle PQR is a right-angled at Q. If $PQ=6$ cm, $PR=10$ cm, then QR is equal to :

- (a) 9 cm
- (b) 8 cm
- (c) 5 cm
- (d) 7 cm

Q32. In the triangle given below, D and E are mid points of AF and AG respectively, F and G are mid points of AB and AC respectively. If $DE = 2.4$ cm, then BC is equal to:



- (a) 9.6 cm
- (b) 7.2 cm
- (c) 4.8 cm
- (d) 3.6 cm

Q33. The angles of a triangle are $2x - 3$, $x + 12$, $x - 1$. The largest angle of the triangle is:

- (a) 42
- (b) 83
- (c) 94
- (d) 55

Q34. The ratio between a base angle and a vertical angle of an isosceles triangle (base angles being equal) is $2 : 5$. The vertical angle is:

- (a) 140°
- (b) 40°
- (c) 100°
- (d) 80°

Q35. Rs. 2,64,000 is invested for 2 years at 10% p.a. simple interest. The interest is:

- (a) Rs. 87,120
- (b) Rs. 52,800
- (c) Rs. 54,780
- (d) Rs. 65,340

Q36. The simple interest on a certain sum at 10% p.a. for three years is Rs 2160. The sum is:

- (a) Rs 9600
- (b) Rs 8400

- (c) Rs 7200
(d) Rs 6400

Q37. In what time will a sum double itself at 10% p.a. simple interest?

- (a) 5 years
(b) 6 years
(c) 8 years
(d) 10 years

Q38. Rs. 10,000 is invested for 3 years at 5% p.a. simple interest. The interest is:

- (a) Rs. 1800
(b) Rs. 1600
(c) Rs. 1500
(d) Rs. 1280

Q39. Consider the following in respect of the variate which takes values 2, 2, 2, 7, 7, 2, 7, 7:
Which of the above statements is/are correct?

- (a) Median > Mean
(b) Median = Mean
(c) Median < Mean
(d) Median or Mean cannot be calculated

Q40. Ten observations 6, 14, 15, 17, $x+1$, $2x-13$, 30, 32, 34, 43 are written in ascending order. The median of the data is 24. What is the value of x ?

- (a) 15
(b) 18
(c) 20
(d) 24

Q41. Consider the following frequency distribution:

| Class | Frequency |
|---------|-----------|
| 0 - 10 | 4 |
| 10 - 20 | 5 |
| 20 - 30 | 7 |
| 30 - 40 | 10 |
| 40 - 50 | 12 |
| 50 - 60 | 8 |
| 60 - 70 | 4 |

What is the median of the distribution?

- (a) 37
(b) 38
(c) 39
(d) 40

Q42. If a variable takes discrete values $a + 4$, $a - 3.5$, $a - 2.5$, $a - 3$, $a - 2$, $a + 0.5$, $a + 5$ and $a - 0.5$ where $a > 0$, then the median of the data set is

- (a) $a - 2.5$
- (b) $a - 1.25$
- (c) $a - 1.5$
- (d) $a - 0.75$

Q43. The mean and median of 5 observations are 9 and 8 respectively. If 1 is subtracted from each observation, then the new mean and the new median will respectively be

- (a) 8 and 7
- (b) 9 and 7
- (c) 8 and 9
- (d) Cannot be determined due to insufficient data

Q44. Find the mode of 4, 4, 4, 9, 15, 15, 15, 27, 37, 48 data set.

- (a) 4 only
- (b) 15 only
- (c) Both 4 and 15
- (d) No mode is available.

Q45. Find the mode of 3, 6, 9, 16, 27, 37, 48.

- (a) 3
- (b) 16
- (c) All numbers are mode.
- (d) No mode is available.

Q46. In a class of 30 students marks obtained by students in mathematics out of 50 is tabulated as below. Calculate the mode of data given.

| Marks Obtained | Number of student |
|----------------|-------------------|
| 10-20 | 5 |
| 20-30 | 12 |
| 30-40 | 8 |
| 40-50 | 5 |

- (a) 26.364
- (b) 26.634
- (c) 25.364
- (d) 25.634

Q47. Find the mode of the following set of marks.

| | | | | | |
|-----------|---|---|---|---|---|
| Marks | 1 | 2 | 3 | 4 | 5 |
| Frequency | 6 | 7 | 7 | 5 | 3 |

- (a) 2 only
- (b) 3 only
- (c) Both 2 and 3
- (d) 7 only

Q48. The following table gives 'less than' type frequency distribution of income per day:

| Income (Rs.) less than | Number of persons |
|------------------------|-------------------|
| 1500 | 100 |
| 1250 | 80 |
| 1000 | 70 |
| 750 | 55 |
| 500 | 32 |
| 250 | 12 |

What is the modal class?

- (a) 250 – 500
- (b) 500 – 750
- (c) 750 – 1000
- (d) None of the above

Q49. The heights (in cm) of 5 students are 150, 165, 161, 144 and 155. What is the value of and median (in cm)?

- (a) 165
- (b) 155
- (c) 160
- (d) 150

Q50. The Median of 19 observations is 30. Two more observations are made and the values of these are 8 and 32. What is the median of the 21 observations?

- (a) 32
- (b) 30
- (c) 20
- (d) Cannot be determined

Solutions

S1. Ans.(b)

$$\begin{aligned}
 \text{Sol. } & \sqrt{(961) \times 35 + 404 + 0.3\% \text{ of } 7200 + 289} \\
 & = 31 \times 35 + 404 + 21.6 + 289 \\
 & = 1085 + 404 + 21.6 + 289 \\
 & = 1799.6
 \end{aligned}$$

S2. Ans.(b)

$$\begin{aligned}
 \text{Sol. } ? & = 3.5 \times 5.5 + 1.5 \times 8.25 + 125.75 \\
 & = 19.25 + 12.375 + 125.75 \\
 & = 157.375
 \end{aligned}$$

S3. Ans.(c)

$$\begin{aligned}
 \text{Sol. } & \sqrt{1354.24} \\
 & = 36.8
 \end{aligned}$$

S4. Ans.(a)**Sol.** LCM of (15, 18, 24) = 360

ATQ

$$\frac{360k+8}{13} = 368$$

Put $k = 1, 2, 3, \dots$ $k = 2$ is divisible by 13

Number = $360 \times 2 + 8 = 728$

Sum of digits = $7 + 2 + 8 = 17$

S5. Ans.(a)**Sol.** $4x4y96$

No. divisible by 88 is also divisible by 8 and 11 divisibility Rule for 8 = last three digit divide by 8.

Divisibility rule for 11 = sum of alternate digits is equal.

$$4+4+9 = x + y + 6$$

$$17 - 6 = x + y$$

$$x + y = 11$$

$$\frac{y96}{8} \Rightarrow y = 2$$

$$x = 9$$

$$x + 2y = 13$$

S6. Ans.(a)**Sol.** LCM of (15, 18, 24) = 360

ATQ

$$\frac{360k+8}{13} = 368$$

Put $k = 1, 2, 3, \dots$ $k = 2$ is divisible by 13

Number = $360 \times 2 + 8 = 728$

Sum of digits = $7 + 2 + 8 = 17$

S7. Ans.(b)

Sol. $x^2 + \frac{1}{x^2} = 20$

$$x^2 + \frac{1}{x^2} - 2 = 18$$

$$x - \frac{1}{x} = 3\sqrt{2}$$

$$x^3 - \frac{1}{x^3} - 3(3\sqrt{2}) = 54\sqrt{2}$$

$$x^3 - \frac{1}{x^3} = 54\sqrt{2} + 9\sqrt{2}$$

$$= 63\sqrt{2}$$

S8. Ans.(a)

Sol. $x - \frac{1}{x} = 5\sqrt{5}$

$$x^3 - \frac{1}{x^3} - 3(5\sqrt{3}) = 625\sqrt{5}$$

$$x^3 - \frac{1}{x^3} = 640\sqrt{5}$$

S9. Ans.(d)

Sol. $3x + \frac{1}{2x} = 29$

$$9x^2 + \frac{1}{4x^2} + 2 \times 3x \times \frac{1}{2x} = 841$$

$$9x^2 + \frac{1}{4x^2} + 3 = 841 \Rightarrow 838$$

S10. Ans.(c)

Sol. $a^3 - b^3 = 243, a - b = 3$

$$(a - b)(a^2 + b^2 + ab) = 243$$

$$a^2 + b^2 + ab = 81 \Rightarrow a^2 + b^2 = 81 - ab \quad (1)$$

$$a - b = 3$$

$$a^2 + b^2 - 2ab = 9$$

$$81 - ab - 2ab = 9$$

$$81 - 9 = 3ab$$

$$72 = 3ab \Rightarrow ab = 24$$

$$a^2 + b^2 = 81 - 24 = 57$$

S11. Ans.(c)

Sol. $a^2 - b^2 = 15, (a - b) = 3$

$$a^2 - b^2 = 15$$

$$(a - b)(a + b) = 15$$

$$(a + b) = 5$$

$$a^2 + b^2 + 2ab = 25$$

S12. Ans.(d)

Sol. $a^3 - b^3 = 512, a - b = 4$

$$(a - b)(a^2 + b^2 + ab) = 512$$

$$(a^2 + b^2 + ab) = 128$$

S13. Ans.(b)

Sol. $x + 45 + 2x = 90^\circ$

$$3x = 45$$

$$x = 15^\circ$$

S14. Ans.(a)

Sol.
$$= \frac{\sin^2 24^\circ + \sin^2(90^\circ - 24^\circ)}{\cos^2 24^\circ + \cos^2(90^\circ - 24^\circ)} + \sin^2 61^\circ + \cos 61^\circ \sin(90^\circ - 61)$$

$$\Rightarrow \frac{\sin^2 24^\circ + \cos^2 24^\circ}{\cos^2 24^\circ + \sin^2 24^\circ} = 1 + 1 \Rightarrow 2$$

S15. Ans.(a)

Sol.

$$\frac{\frac{1}{2} - \frac{1}{2} + 1}{\frac{\sqrt{3}}{2} - 1 + 1} = \frac{1}{\frac{\sqrt{3}}{2}}$$

$$= \frac{2}{\sqrt{3}} = \boxed{\frac{2\sqrt{3}}{3}}$$

S16. Ans.(b)

Sol. $3x + 30^\circ + 2x = 90^\circ$

$5x = 60^\circ$

$x = 12^\circ$

S17. Ans.(b)

Sol.

$$\frac{1}{4} \times \frac{1}{2} + 2 \times \frac{1}{3} - 4$$

$$= \frac{1}{8} + \frac{2}{3} - 4$$

$$= \frac{3+16-96}{24} = -\frac{77}{24}$$

S18. Ans.(b)

Sol. $\sin(A + B) = \frac{\sqrt{3}}{2}$

$A + B = 60^\circ$

$\tan(A - B) = \frac{1}{\sqrt{3}}$

$A - B = 30^\circ$

after solving,

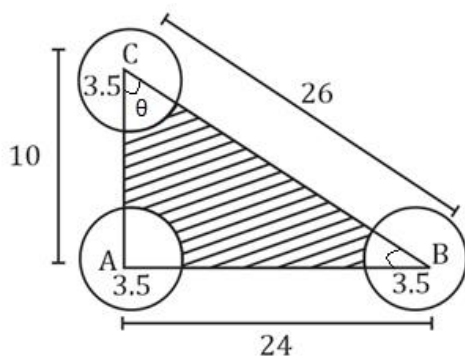
$A = 45^\circ$

$B = 15^\circ$

Req. value = $90^\circ + 45^\circ = 135^\circ$

S19. Ans.(b)

Sol.



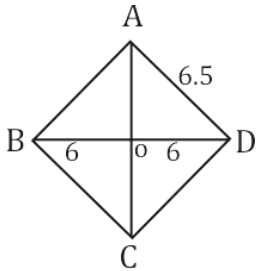
(10, 24, 26) is a triplicate.

Area of excluding portion -

$$\begin{aligned} &\Rightarrow \text{Area of triangle} - (\text{Ar. of Sec. A} + \text{Ar. Sec B} + \text{Ar. Sec C}) \\ &= \frac{1}{2} \times 24 \times 10 - \left(\pi (3.5)^2 \times \frac{90}{360} + \pi (3.5)^2 \frac{\theta}{360} + \pi (3.5)^2 \frac{90-\theta}{360} \right) \\ &= 120 - (\pi) (3.5)^2 \left(\frac{1}{4} + \frac{1}{4} \right) \\ &= 120 - \frac{22}{7} \times 35 \times 3.5 \times \frac{1}{2} = 120 - 19.75 = 100.75 \text{ cm}^2 \end{aligned}$$

S20. Ans.(c)

Sol.



$$\begin{aligned} OA^2 &= AD^2 - OD^2 \\ OA^2 &= (6.5)^2 - (6)^2 \\ &= 42.25 - 36.00 = 6.25 \end{aligned}$$

$$OA = \sqrt{6.25}$$

$$OA = 2.5$$

$$\begin{aligned} \text{Area of rhombus} &= \frac{1}{2} \times d_1 \times d_2 \\ &= \frac{1}{2} \times 12 \times 5 = 30 \text{ cm}^2 \end{aligned}$$

S21. Ans.(b)

Sol. diagonal of square = $\sqrt{2} a$

A. T. Q

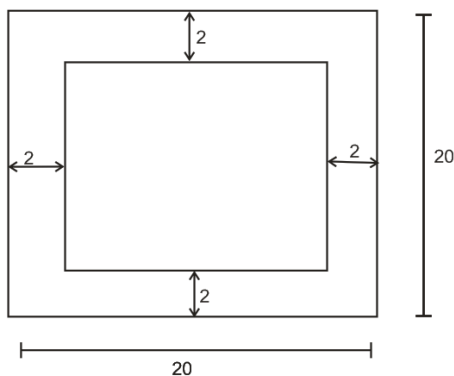
$$a^2 = 64$$

$$a = 8$$

$$\text{Diagonal} = 8\sqrt{2}$$

S22. Ans.(d)

Sol. Side of chessboard = $8 \times 2 = 16$ cm.



$$\text{Perimeter of chessboard} = 20 \times 4 = 80 \text{ cm}$$

S23. Ans.(b)

Sol. 4 x side = Perimeter

$$\text{Side} = \frac{230}{4} = 57.5\text{m}$$

$$\begin{aligned} \text{Area to be painted} &= 2(5)(57.5 + 57.5) \\ &= 10 \times 115 \\ &= 1150\text{m}^2 \end{aligned}$$

$$\text{Cost} = 7.50 \times 1150 = \text{Rs. } 8625$$

S24. Ans.(b)

$$\begin{aligned} \text{Sol. Area} &= \frac{1}{2}d(h_1 + h_2) \\ &= \frac{1}{2} \times 40(7.5 + 8.6) = 322 \text{ cm}^2 \end{aligned}$$

S25. Ans.(c)

$$\text{Sol. } a + b + c + d + 40^\circ + 50^\circ + 30^\circ + 70^\circ = 360^\circ$$

$$\frac{a + b + c + d}{4} = \frac{170}{4} = 42.5^\circ$$

S26. Ans.(c)

$$x + y = 144$$

$$x - y = \frac{\pi}{15} \times \frac{180}{\pi}$$

$$x - y = 12$$

$$x - 78$$

$$x = 78 \times \frac{\pi}{180} = \frac{13\pi}{30}$$

S27. Ans.(d)

Sol. $\Delta ABC \sim \Delta QPR$

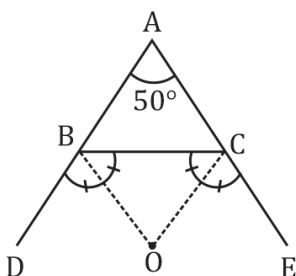
$$\frac{\text{ar } \Delta ABC}{\text{AR } \Delta QPR} = \frac{9}{4}, \text{ side} = \sqrt{\frac{\text{ar } ABC}{\text{ar } QPR}}$$

$$\frac{BC}{PR} = \sqrt{\frac{9}{4}} \Rightarrow \frac{15}{PR} = \frac{3}{2}$$

$$PR = 10 \text{ cm.}$$

S28. Ans.(b)

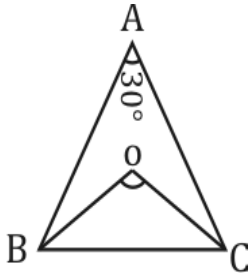
Sol.



$$\begin{aligned}\angle BOC &= 90 - \frac{1}{2} \angle A \\ &= 90 - 25 = 65^\circ\end{aligned}$$

S29. Ans.(a)

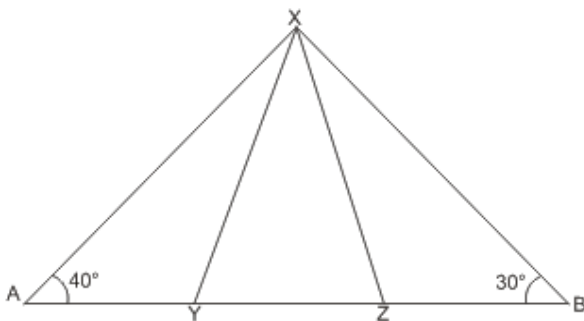
Sol.



$$\begin{aligned}\angle BOC &= 90 + \frac{1}{2} \angle A \\ &= 105^\circ\end{aligned}$$

S30. Ans.(b)

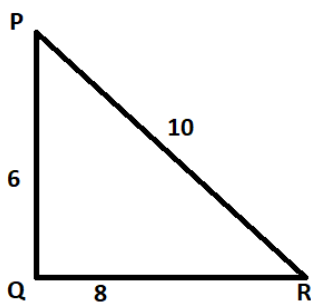
Sol.



$$\begin{aligned}\angle AXB &= 180 - (40 + 30) \\ &= 110^\circ\end{aligned}$$

S31. Ans.(b)

Sol.



By Pythagoras theorem,

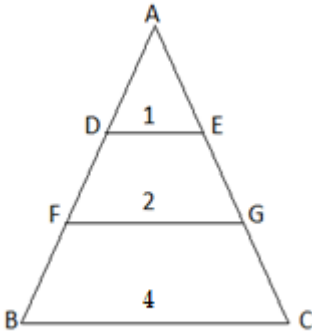
$$PR^2 = PQ^2 + QR^2$$

$$(10)^2 = (6)^2 + QR^2$$

$$QR = 8\text{cm}$$

S32. Ans.(a)

Sol.



$$1 - 2.4$$

$$4 - 9.6\text{cm}$$

S33. Ans.(b)

Sol. $2x-3+x+12+x-1 = 180$

$$4x+8 = 180$$

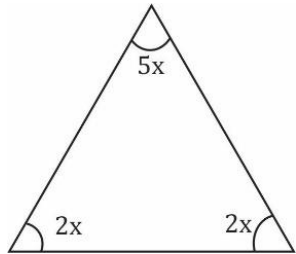
$$4x = 172$$

$$x = 43$$

$$\text{Largest Angle} = 2x-3 = 86-3=83$$

S34. Ans.(c)

Sol. A.T.Q.



$$2x+2x+5x = 180$$

$$9x = 180$$

$$x = 20$$

$$\text{Vertical angle} = 20 \times 5 = 100^\circ$$

S35. Ans.(b)

Sol.

$$\text{S.I.} = \frac{2,64,000 \times 10 \times 2}{100} = \text{Rs. } 52,800$$

S36. Ans.(c)

Sol.

$$\text{Sum} = \frac{\text{S.I.} \times 100}{\text{R} \times \text{T}} = \frac{2160 \times 100}{10 \times 3} = \text{Rs. } 7200$$

S37. Ans.(d)

Sol. Let Sum = x S.I. = x (A.T.Q)

$$\text{S.I.} = \frac{P \times R \times T}{100} \Rightarrow x = \frac{x \times 10 \times T}{100}$$

$$T = 10 \text{ years}$$

S38. Ans.(c)

Sol.

$$\text{S.I.} = \frac{10,000 \times 3 \times 5}{100} = \text{Rs. } 1500$$

S39. Ans.(b)

Sol. Arrange the given items in ascending order: 2, 2, 2, 2, 7, 7, 7, 7

Number of terms = 8 (even)

$$\text{Mean} = \frac{2+2+2+2+7+7+7+7}{8}$$

$$= \frac{36}{8}$$

$$= 4.5$$

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

$$= \frac{2 + 7}{2}$$

$$= 4.5$$

Hence, Median = Mean

S40. Ans.(c)

Sol. Here number of terms is 10 i.e. even.

$$\text{Median} = \frac{(x+1)+(2x-13)}{2}$$

$$\Rightarrow 24 = \frac{3x - 12}{2}$$

$$\Rightarrow 48 = 3x - 12$$

$$\Rightarrow x = 20$$

S41. Ans.(c)

Sol.

| Class | Frequency | Cumulative frequency |
|---------|-----------|----------------------|
| 0 - 10 | 4 | 4 |
| 10 - 20 | 5 | 9 |
| 20 - 30 | 7 | 16 |
| 30 - 40 | 10 | 26 |
| 40 - 50 | 12 | 38 |
| 50 - 60 | 8 | 46 |
| 61 - 70 | 4 | 50 |

Median class = (30 – 40).

$$l = 30$$

$$\frac{n}{2} = 25$$

$$cf = 16$$

$$f = 10$$

$$h = 10$$

$$\text{Median} = l + \frac{\frac{n}{2} - cf}{f} \times h$$

$$= 30 + \frac{25 - 16}{10} \times 10$$

$$= 39$$

S42. Ans.(b)

Sol. Arrange given values in ascending order.

$(a - 3.5), (a - 3), (a - 2.5), (a - 2), (a - 0.5), (a + 0.5), (a + 4), (a + 5)$

Number of terms = 8

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

$$= \frac{(a - 2) + (a - 0.5)}{2}$$

$$= a - 1.25$$

S43. Ans.(a)

Sol. If n is subtracted from each observation. Then mean and median are also reduced by n .

$$\text{New mean} = 9 - 1 = 8$$

$$\text{New median} = 8 - 1 = 7$$

S44. Ans.(c)

Sol. Given: 4, 4, 4, 9, 15, 15, 15, 27, 37, 48 is the data set.

As we know, a data set or set of values can have more than one mode if more than one value occurs with equal frequency or number of times compared to the other values in the set.

Hence, here both the numbers 4 and 15 are modes of the set.

S45. Ans.(d)

Sol. If no value or number in a data set appears more than once, then the set has no mode.

Hence, for the set 3, 6, 9, 16, 27, 37, 48, there is no mode available.

S46. Ans.(a)

Sol. The maximum class frequency is 12 and the class interval corresponding to this frequency is 20 – 30.

Thus, the modal class is 20 – 30.

Lower limit of the modal class (l) = 20,

Size of the class interval (h) = 10,

Frequency of the modal class (f_1) = 12,

Frequency of the class preceding the modal class (f_0) = 5,
 Frequency of the class succeeding the modal class (f_2) = 8

$$\begin{aligned} \text{Mode} &= l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h \\ &= 20 + \left(\frac{12 - 5}{2 \times 12 - 5 - 8} \right) \times 10 \\ &= 20 + \left(\frac{7}{11} \right) \times 10 \\ &= 20 + 6.364 \\ &= 26.364 \end{aligned}$$

S47. Ans.(c)

Sol. The marks 2 and 3 have the highest frequency. So, the modes are 2 and 3.

S48. Ans.(b)

Sol.

| Income | Number of persons |
|-------------|-------------------|
| 0 – 250 | 12 |
| 250 – 500 | 32 – 12 = 20 |
| 500 – 750 | 55 – 32 = 23 |
| 750 – 1000 | 70 – 55 = 15 |
| 1000 – 1250 | 80 – 70 = 10 |
| 1250 – 1500 | 100 – 80 = 20 |

Highest frequency is 23 which belongs to class (500 – 750).
 Modal class = (500 – 750).

S49. Ans.(b)

Sol. Arrange data in ascending order:

144, 150, 155, 161, 165

Number of terms, $n = 5$, which is odd.

Therefore, Median = $\frac{5+1}{2}$ term = 3rd term

Hence, Median = 155

S50. Ans.(b)

Sol. Since, the median is a positional average.

8 will come before 30 and 32 will come after 30.

Therefore, median will remain same.

\Rightarrow median = 30

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