Sample Question Paper - 1
Class- IX Session- 2021-22
TERM 1
Subject- Mathematics

Time Allowed: 1 hour and 30 minutes **Maximum Marks: 40**

General Instructions:

1. The question paper contains three parts A, B and C.
2. Section A consists of 20 questions of 1 mark each. Attempt any 16 questions.
3. Section B consists of 20 questions of 1 mark each. Attempt any 16 questions.
4. Section C consists of 10 questions based on two Case Studies. Attempt any 8 questions.
5. There is no negative marking.

Section A

Attempt any 16 questions

1. If $x^{-2} = 64$, then $x^{\frac{1}{3}} + x^0 =$ **[1]**

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

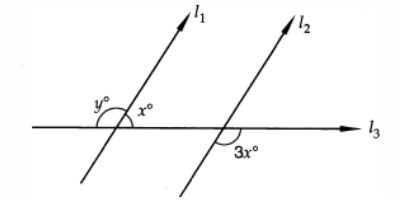
   c) $\frac{3}{2}$ d) 2

2. How many lines pass through one point? **[1]**

   a) one b) three

   c) two d) many

3. In Fig. if $l_1 \parallel l_2$, what is the value of y? **[1]**



   a) 100 b) 150

   c) 120 d) 135

4. If the area of an equilateral triangle is $16\sqrt{3}\ cm^2$, then the perimeter of the triangle is **[1]**

   a) 36 cm b) 48 cm

   c) 24 cm d) 12 cm

5. If $x = \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$ and $y = \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}$, then x + y + xy = **[1]**

   a) 5 b) 9

   c) 17 d) 7

6. The graph of the linear equation 2x + 3y = 6 is a line which meets the x-axis at the point **[1]**

a) (0,3)

b) (3,0)

c) (2, 0)

d) (0 ,2)

7. An exterior angle of a triangle is 80^0 and the interior opposite angles are in the ratio 1 : 3. Measure of each inte4rior opposite angle is : **[1]**

a) 30^0, 60^0

b) 20^0, 60^0

c) 30^0, 90^0

d) 40^0, 120^0

8. If $\triangle ABC \cong \triangle PQR$ and $\triangle ABC$ is not congruent to $\triangle RPQ$, then which of the following is not true: **[1]**

a) AC = PR

b) BC = PQ

c) AB = PQ

d) QR = BC

9. The simplest form of $0.5\overline{7}$ is **[1]**

a) $\frac{26}{45}$

b) $\frac{57}{99}$

c) $\frac{57}{100}$

d) none of these

10. In the class intervals 10-20, 20-30 the number 20 is included in **[1]**

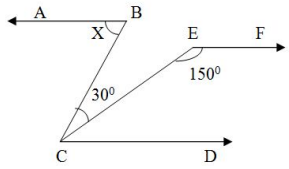
a) both the intervals

b) 20-30

c) none of these intervals

d) 10-20

11. In the adjoining figure, AB || CD and AB || EF. The value of x is :- **[1]**



a) 70°

b) 40°

c) 60°

d) 50°

12. Two rational numbers between $\frac{2}{3}$ and $\frac{5}{3}$ are **[1]**

a) $\frac{1}{6}$ and $\frac{2}{6}$

b) $\frac{5}{6}$ and $\frac{7}{6}$

c) $\frac{2}{3}$ and $\frac{4}{3}$

d) $\frac{1}{2}$ and $\frac{2}{1}$

13. If x = $(7+4\sqrt{3})$ then $\left(x+\frac{1}{x}\right)=$? **[1]**

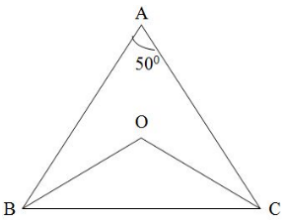
a) 14

b) 48

c) $8\sqrt{3}$

d) 49

14. In the given figure, BO and CO are the bisectors of ∠B and ∠C respectively. If ∠A = 50°, then ∠BOC = ? **[1]**



a) 115°

b) 120°

c) 130° d) 100°

15. If the point (3,4) lies on the graph of 3y = ax + 7 then the value of a is **[1]**

a) $\frac{2}{5}$ b) $\frac{2}{7}$

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

16. Tally marks are used to find **[1]**

a) Range b) Class intervals

c) Upper limits d) Frequency

17. The sides of a triangle are in ratio 3 : 4 : 5. If the perimeter of the triangle is 84 cm, then area of the triangle is : **[1]**

a) 274 cm^2 b) 252 cm^2

c) 294 cm^2 d) 290 cm^2

18. A grouped frequency distribution table with classes of equal sizes using 63-72 (72 included) as one of the class is constructed for the following data **[1]**
30, 32, 45, 54, 74, 78, 108, 112, 66, 76, 88 40, 14, 20, 15, 35, 44, 66, 75, 84, 95, 96, 102, 110, 88, 74, 112, 14, 34, 44. How many classes can we have?

a) 11 b) 10

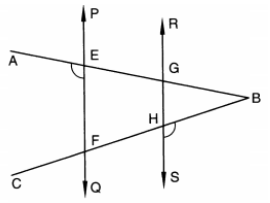
c) 12 d) 9

19. If $x = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ and $y = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$, then $x^2 + xy + y^2$ = **[1]**

a) 102 b) 101

c) 99 d) 98

20. In Fig, *PQ* || *RS*, ∠*AEF* =95°, ∠*BHS* =110° and ∠*ABC* =*x*°. Then the value of *x* is, **[1]**



a) 35° b) 25°

c) 70° d) 15°

Section B

Attempt any 16 questions

21. The graph of x = -4 is a straight line **[1]**

a) passing through origin b) intersecting the axex

c) parallel to x-axis d) parallel to y-axis

22. The sides of a triangle are 11 cm, 15 cm and 16 cm. The altitude to the largest side is **[1]**

a) $30\sqrt{7}$,cm b) 30 cm

c) $\frac{15\sqrt{7}}{2}$ cm d) $\frac{15\sqrt{7}}{4}$ cm

23. The equation x = 7 in two variables can be written as **[1]**

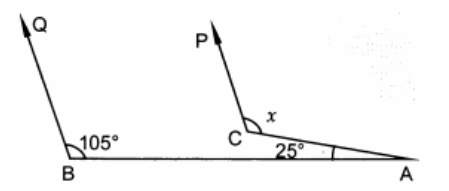
a) 1.x + 1.y = 7

b) 1.x + 0.y = 7

c) 0.x + 1.y = 7

d) 0.x + 0.y = 7

24. In Fig. if CP ||BQ, then the measure of x is **[1]**



a) 130°

b) 175°

c) 105°

d) 125°

25. $(-2-\sqrt{3})(-2+\sqrt{3})$ when simplified is **[1]**

a) negative and irrational

b) positive and irrational

c) negative and rational

d) positive and rational

26. If the area of an isosceles right triangle is 8 cm^2, what is the perimeter of the triangle? **[1]**

a) $8 + 4\sqrt{2}$ cm^2

b) $8 + \sqrt{2}$ cm^2

c) $12\sqrt{2}$ cm^2

d) $4 + 8\sqrt{2}$ cm^2

27. The mean weight of six boys in a group is 48 kg. The individual weights of five of them are 51 kg, 45 kg, 49 kg, 46 kg and 44 kg. The weight of the 6th boy is **[1]**

a) 52.8 kg

b) 52 kg

c) 47 kg

d) 53 kg

28. The value of $\left\{\left(23+2^2\right)^{\frac{2}{3}}+(150-29)^{\frac{1}{2}}\right\}^2$, is **[1]**

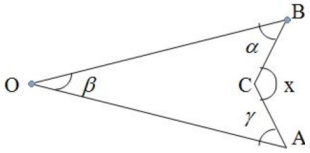
a) 286

b) 324

c) 400

d) 196

29. In the given figure the value of x =? **[1]**



a) $\alpha + \beta - \gamma$

b) $\alpha + \gamma - \beta$

c) $\alpha + \beta + \gamma$

d) $\alpha - \beta - \gamma$

30. Mode is **[1]**

a) middle most value

b) most frequent value

c) least frequent value

d) none of these

31. If the sides of a triangle are doubled, then its area **[1]**

a) remains the same

b) becomes four times

c) becomes doubled

d) becomes three times

32. When $15\sqrt{15}$ is divided by $3\sqrt{3}$ the quotient is **[1]**

a) $3\sqrt{5}$ b) $5\sqrt{3}$

c) $3\sqrt{3}$ d) $5\sqrt{5}$

33. If the measures of angles of a triangle are in the ratio of 3 : 4 : 5, what is the measure of the smallest angle of the triangle? **[1]**

a) 60° b) 45°

c) 30° d) 25°

34. In a histogram, which of the following is proportional to the frequency of the corresponding class? **[1]**

a) Width of the rectangle b) Length of the rectangle

c) Perimeter of the rectangle d) Area of the rectangle

35. If two angles are complements of each other then each angle is **[1]**

a) a reflex angle b) an acute angle

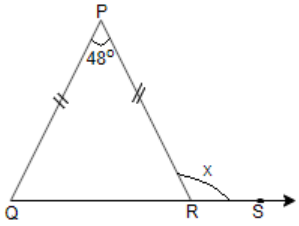
c) a straight angle d) an obtuse angle

36. The point which lies on y-axis at a distance of 6 units in the positive direction of y-axis is **[1]**

a) (-6, 0) b) (6, 0)

c) (0, -6) d) (0, 6)

37. In the adjoining fig, PQ = PR. If $\angle QPR$ = 48°, then value of x is: **[1]**



a) 132^o b) 114°

c) 104^o d) 96^o

38. Value of $\sqrt[4]{(81)^{-2}}$ is **[1]**

a) $\frac{1}{9}$ b) $\frac{1}{81}$

c) 9 d) $\frac{1}{3}$

39. The difference between the upper and the lower class limits is called **[1]**

a) mean b) class size

c) frequency d) mid-points

40. The mean of the below frequency distribution is 3.5, then the value of x is **[1]**

Variable	1	2	X	4	5
Frequency	2	3	4	5	6

a) 3 b) 4

c) 5 d) 2

Section C

Attempt any 8 questions

Question No. 41 to 45 are based on the given text. Read the text carefully and answer the questions:

A children's park is in the shape of isosceles triangle said PQR with PQ = PR, S and T are points on QR such that QT = RS.

41. Which rule is applied to prove that congruency of △PQR and △PRT. **[1]**

a) SAS b) AAS

c) RHS d) SSS

42. In RHS rule **H** stands for: **[1]**

a) Heron's formula b) Hypotenuse

c) Height d) Highest

43. An isosceles triangle has **[1]**

a) All angles equal b) 3 sides equal

c) None of these sides equal d) 2 sides equal

44. If PQ = 6 cm and QR = 7 cm, then perimeter of △PQR is: **[1]**

a) 19 cm b) 13 cm

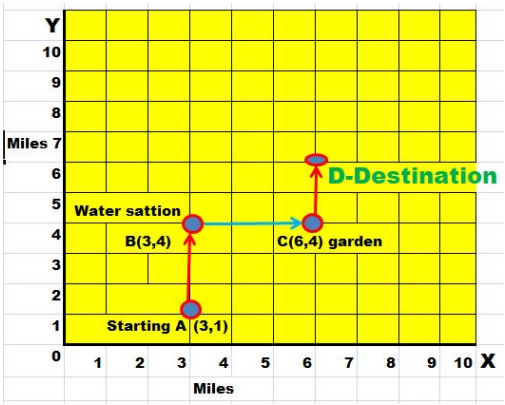
c) 20 cm d) 18 cm

45. If ∠QPR = 80^o find ∠PQR? **[1]**

a) 40^o b) 100^o

c) 20^o d) 50^o

Question No. 46 to 50 are based on the given text. Read the text carefully and answer the questions:



Arun is participating in an **8 miles** walk. The organizers used a square coordinate grid to plot the course. The starting point is at A (3, 1). At B (3, 4), there's a water station to make sure the walkers stay

hydrated.

From water station, the walkway turns right and at C (6,4) a garden is situated to keep walkers fresh.

From the garden, the walkway turns left and finally, Arun reaches at destination D to complete 8 miles.

46. How far is the water station B from the starting point A? **[1]**

a) 5 miles b) 1 miles

c) 4 miles d) 3 miles

47. How far is the water station B from garden C? **[1]**

a) 4 miles b) 3 miles

c) 5 miles d) 1 miles

48. What is the abscissa of destination point D? **[1]**

a) 5 b) 3

c) 6 d) 3

49. What is the ordinate of destination point D? **[1]**

a) 6 b) 2

c) 5 d) 3

50. What are the coordinates of destination point D? **[1]**

a) (3, 9) b) (6, 6)

c) (6, 5) d) (5, 6)

Solution

Section A

1. **(c)** $\frac{3}{2}$

   Explanation: $x^{-2} = 64$

   $\Rightarrow x^{-2} = 8^2$

   $\Rightarrow \left(\frac{1}{x}\right)^2 = (8)^2$

   $\therefore \frac{1}{x} = 8 \Rightarrow x = \frac{1}{8}$

   $x^{\frac{1}{3}} + x^0 = \left(\frac{1}{8}\right)^{\frac{1}{3}} + 1$

   $= \left[\left(\frac{1}{2}\right)^3\right]^{\frac{1}{3}} + 1 = \left(\frac{1}{2}\right)^{3\times\frac{1}{3}} + 1$

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

2. **(d)** many

   Explanation: Because one point can be solution of many equations. So many equations can be pass from one point.

3. **(d)** 135

   Explanation: Given that,

   $l_1 \parallel l\, l_2$ and l_3 is transversal

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

   $y = \angle 1$ (Corresponding angle)

   $y = 3x$ (i)

   $y + x = 180^o$ (Linear pair)

   $3x + x = 180^o$ [From (i)]

   $4x = 180^o$

   $x = 45^o$

   Therefore,

   $y = 3x = 3 * 45^o$

   $= 135^o$

4. **(c)** 24 cm

   Explanation: Area of equilateral triangle = $\frac{\sqrt{3}}{4}(\text{Side})^2 = 16\sqrt{3}$

   $\Rightarrow (\text{Side})^2 = 64$

   $\Rightarrow$ Side = 8 cm

   Perimeter of equilateral triangle = $3 \times$ side

   $= 3 \times 8 = 24$ cm

5. **(b)** 9

   Explanation: Given $x= \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$ and $y = \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}$

   Then,

   $x + y + xy = \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}} + \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}} + \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}} \times \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}$

   $= \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}} \times \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}+\sqrt{3}} + \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}} \times \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}-\sqrt{3}} + 1$

   $= \frac{(\sqrt{5}+\sqrt{3})^2}{5-3} + \frac{(\sqrt{5}-\sqrt{3})^2}{5-3} + 1$

   $= \frac{(\sqrt{5})^2+(\sqrt{3})^2+2(\sqrt{5})(\sqrt{3})}{2} + \frac{(\sqrt{5})^2+(\sqrt{3})^2-2(\sqrt{5})(\sqrt{3})}{2} + 1$

   $= \frac{5+3+2\sqrt{15}}{2} + \frac{5+3-2\sqrt{15}}{2} + 1$

= $\frac{8+2\sqrt{15}}{2}$ + $\frac{8-2\sqrt{15}}{2}$ +1
= 4 + $\sqrt{15}$ + 4 - $\sqrt{15}$ +1
= 8+1
=9

6. **(b)** (3,0)
Explanation: 2x + 3y = 6 meets the X-axis.
Put y = 0,
2x + 3(0) = 6
x = 3
Therefore, graph of the given line meets X-axis at (3, 0).

7. **(b)** 20^0, 60^0
Explanation: let the common ratio is x
the ratio of interior angles are 1 : 3
so angles are x and 3x
x+3 x=80
4 x=80
$x = \frac{80}{4}$
x=20
so angles are 20^0 and 60^0

8. **(b)** BC = PQ
Explanation: According to the condition given in the question,
If $\triangle ABC \cong \triangle PQR$ and $\triangle ABC$ is not congruent to $\triangle RPQ$
Then, clearly BC $\neq$ PQ
$\therefore$ It is false

9. **(a)** $\frac{26}{45}$
Explanation: $0.5\overline{7}$ = $\frac{57-5}{90}$
= $\frac{52}{90}$ = $\frac{26}{45}$

10. **(b)** 20-30
Explanation: Since, 10 - 20, 20 - 30 are Exclusive Class Intervals, the upper limit of a class is not included in the class.
Thus, 20, will be taken in the class 20 - 30

11. **(c)** 60°
Explanation: $\angle$FEC + $\angle$ECD = 180° (sum of 2 supplimentary angles is 180°)
$\angle$ECD = $\angle$180° - 150° = 30°
$\angle$X= $\angle$BCE = $\angle$ECD
$\angle$X= 30° + 30° = 60°

12. **(b)** $\frac{5}{6}$ and $\frac{7}{6}$
Explanation: $\frac{2}{3}$ and $\frac{5}{3}$
$\frac{2}{3}$= $\frac{2\times2}{3\times2}$ = $\frac{4}{6}$
$\frac{5}{3}$ = $\frac{5\times2}{3\times2}$ = $\frac{10}{6}$
$\frac{4}{6}$ < $\frac{5}{6}$ < $\frac{6}{6}$<$\frac{7}{6}$< $\frac{10}{6}$
$\frac{5}{6}$ and $\frac{7}{6}$

13. **(a)** 14
Explanation: x = $(7+4\sqrt{3})$
$\frac{1}{x}$= $\frac{1}{7+4\sqrt{3}}$= $(7-4\sqrt{3})$
x+$\frac{1}{x}$ =$(7+4\sqrt{3})$+ $(7-4\sqrt{3})$
= 14

14. **(a)** 115°
Explanation: In $\triangle ABC$
2x + 2y + $\angle A$ = 180° (Angle sum property)
x + y + ($\angle A/2$) = 90°
x + y = 90° – (A/2) ...1
In $\triangle BOC$, we have
x + y + $\angle BOC$ = 180°
90° - ($\angle A/2$) + $\angle BOC$ = 180° [From (1)]
$\angle BOC$ = 180° - 90° + (A/2)
$\angle BOC$ = 90° + (A/2)
$\angle BOC$ = 90° + 25° = 115°

15. **(d)** $\frac{5}{3}$
Explanation: Given equation: 3y = ax + 7
Also, (3, 4) lies on the graph of the equation.
Putting x = 3, y = 4 in the equation, we get:
$3 \times 4 = 3a + 7$
$\Rightarrow$ 12 = 3a + 7
$\Rightarrow$ 3a = 12 − 7 = 5
$\Rightarrow \quad a = \frac{5}{3}$

16. **(d)** Frequency
Explanation: When observations are large, it may not be easy to find the frequencies by simple counting. So, we make use of tally marks.
Thus, Tally marks are used to find frequency.

17. **(c)** 294 cm^2
Explanation: Let the sides be 3x, 4x and 5x.
Then according to quesiton, 3x + 4x + 5x = 84
$\Rightarrow$ 12x = 84
$\Rightarrow$ x = 7
Therefore, the sides are 3×7 = 21, cm, 4×7 = 28 cm and 5×7 = 35 cm
s = $\frac{21+28+35}{2}$ = 42 cm
Area of triangle = $\sqrt{s\left(s-a\right)\left(s-b\right)\left(s-c\right)}$
= $\sqrt{42\left(42-21\right)\left(42-28\right)\left(42-35\right)}$
= $\sqrt{42 \times 21 \times 14 \times 7}$
= $21 \times 7 \times 2$ = 294 sq. cm

18. **(b)** 10
Explanation: The given frequency varies from 14 to 112.
So the class intervals are:
13-22, 23-32, 33-42, 43-52, 53-62, 63-72, 73-82, 83-92, 93-102, 103-112.
Number of class interval = 10.

19. **(c)** 99
Explanation: Given x = $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ and y= $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$,
Consider,
x = $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$
= $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}} \times \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}-\sqrt{2}}$
= $\frac{(\sqrt{3}-\sqrt{2})^2}{(\sqrt{3})^2+(\sqrt{2})^2}$
= $\frac{(\sqrt{3})^2+(\sqrt{2})^2-2(\sqrt{3})(\sqrt{2})}{3-2}$
= $\frac{3+2-2\sqrt{6}}{1}$
= 5-2$\sqrt{6}$

Hence x = 5-2$\sqrt{6}$

$\Rightarrow x^2 = (5-2\sqrt{6})^2$

$= 25 + 24 - 20\sqrt{6}$

$= 49-20\sqrt{6}$

i.e. $x^2 = 49-20\sqrt{6}$ ----(i)

Again consider

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

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

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

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

$= \frac{3+2+2\sqrt{6}}{1}$

$= 5+2\sqrt{6}$

Hence $y=5+2\sqrt{6}$

$\Rightarrow y^2 = (5+2\sqrt{6})^2$

$= 25+24+20\sqrt{6}$

$= 49+20\sqrt{6}$

i.e. $y^2 = 49 + 20\sqrt{6}$ ---(ii)

Then $x^2 + xy + y^2$

$= 49-20\sqrt{6} + \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}} \times \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} + 49 + 20\sqrt{6}$ [from (i) nd (ii)]

$= 98+1$

$= 99$

20. **(b)** 25°

Explanation: Given that,

PQ ∥ RS

$\angle AEF = 95^o$

$\angle BHS = 110^o$

$\angle ABC = x^o$

$\angle AEF = \angle AGH = 95^o$ (Corresponding angles)

$\angle AGH + \angle HGB = 180^o$ (Linear pair)

$95^o + \angle HGB = 180^o$

$\angle HGB = 85^o$

$\angle BHS + \angle BHG = 180^o$ (Linear pair)

$110^o + \angle BHG = 180^o$

$\angle BHG = 70^o$

In △BHG,

$\angle BHG + \angle HGB + \angle GBH = 180^o$

$70^o + 85^o + \angle GBH = 180^o$

$\angle GBH = 25^o$

Thus,

$\angle ABC = \angle GBH = 25^o$

Section B

21. **(d)** parallel to y-axis

Explanation: We know that the general equation of a line parallel to y-axis is

x = a

So x = -4 is a line parallel to y-axis.

22. **(d)** $\frac{15\sqrt{7}}{4}$cm

Explanation: s = $\frac{11+15+16}{2}$ = 21 cm

Area of $= \Delta = \sqrt{s(s-a)(s-b)(s-c)}$ = $\sqrt{21 \times 10 \times 6 \times 5} = 30\sqrt{7}\text{cm}^2$

Also if we choose largest side and its Altitude, the area would be

A = $\frac{1}{2}$ × largest side × h

$\Rightarrow \frac{1}{2} \times 16 \times h = 30\sqrt{7}$

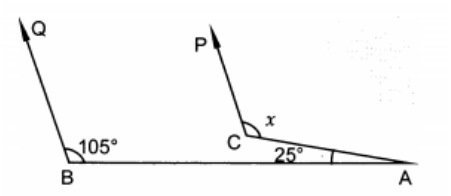
$\Rightarrow h = \frac{30\sqrt{7}}{8}$ = $\frac{15\sqrt{7}}{4}$cm

23. **(b)** 1.x + 0.y = 7

Explanation: The equation x = 7 in two variables can be written as exactly 1.x + 0.y = 7 because it contain two variable x and y and coefficient of y is zero as there is no term containing y in equation x = 7

24. **(a)** 130°

Explanation: Given that,



CP ∥ BQ

Produce CP to E

So, PE ∥ BQ and AB cuts them

∠QBE = ∠QBA = 105^o (Corresponding angles)

In △ECA

∠CEA + ∠ECA + ∠EAC = 180^o

105^o + ∠ECA + 25^o = 180^o

∠ECA = 50^o

∠PCA + ∠ECA = 180^o (Linear pair)

x + 50^o = 180^o

x = 130^o

25. **(d)** positive and rational

Explanation: $(-2-\sqrt{3})(-2+\sqrt{3})$

= $(-2)^2 - (\sqrt{3})^2$

= 4-3

=1

positive and rational

26. **(a)** 8 + 4$\sqrt{2}$ cm^2

Explanation: Let each of the two equal sides of an isosceles right triangle be a cm

Then, third side = $a\sqrt{2}$m

Area of $\Delta = \frac{1}{2} \times 2 \times 2$

$\Rightarrow 8 = \frac{a^2}{2}$

$\Rightarrow$ a^2 = 16

$\Rightarrow$ a = 4 cm

$\Rightarrow$ Perimeter

$\Rightarrow$ a + a + a $\sqrt{2}$ = 4 + 4 + 4 $\sqrt{2}$ = 8 + 4$\sqrt{2}$ cm^2

27. **(d)** 53 kg

Explanation: Mean weight of six boys = 48 kg

Let the weight of the 6th boy be x kg.

We know:

Mean = $\frac{\text{Sum of all observations}}{\text{Total number of observations}}$

$= \frac{51+45+49+46+44+x}{6}$

$= \frac{235+x}{6}$

Given :

Mean = 48 kg

$\Rightarrow \frac{235+x}{6} = 48$

$\Rightarrow$ 235 + x = 288

$\Rightarrow$ x = 53

Hence, the weight of the 6th boy is 53 kg.

28. **(c)** 400

Explanation: $\left\{\left(23+2^2\right)^{\frac{2}{3}}+(150-29)^{\frac{1}{2}}\right\}^2$

$= \left[(23+4)^{\frac{2}{3}}+(150-29)^{\frac{1}{2}}\right]^2$

$= \left[(27)^{\frac{2}{3}}+(121)^{\frac{1}{2}}\right]^2$

$= \left[\left(3^3\right)^{\frac{2}{3}}+\left(11^2\right)^{\frac{1}{2}}\right]^2$

$= (9 + 11)^2$

$= (20)^2$

= 400

29. **(c)** $\alpha + \beta + \gamma$

Explanation: OBCA is a quadrilateral

$\angle$OAC + $\angle$BOA + $\angle$ACB + $\angle$CBO = 360°

$\gamma + \beta + \angle$ACB + α = 360°

$\angle$ACB = $360^0 - \gamma - \beta - \alpha$

x = 360° - $\angle$ACB

x = $\gamma + \beta + \alpha$

30. **(b)** most frequent value

Explanation: We know that, mode is the observation which occur maximum number of times.

31. **(b)** becomes four times

Explanation: Area of triangle with sides a, b and c.

(A) = $\sqrt{s(s-a)(s-b)(s-c)}$

New sides are 2a, 2b and 2c

s' = $\frac{2a+2b+2c}{2}$ = a + b + c = 2s .....(i)

New Area = $\sqrt{s'(s'-2a)(s'-2b)(s'-2c)}$

= $\sqrt{2s(2s-2a)(2s-2b)(2s-2c)}$ [From eq.(i)]

= $4\sqrt{s(s-a)(s-b)(s-c)}$

= 4A

Therefore, the new area will be four times the old area.

32. **(d)** $5\sqrt{5}$

Explanation: $15\sqrt{15}$ is divided by $3\sqrt{3}$

= $\frac{15\sqrt{15}}{3\sqrt{3}}$

= $\frac{5\sqrt{3}\sqrt{5}}{\sqrt{3}}$

= $5\sqrt{5}$

33. **(b)** 45°

Explanation: The measures of angles of a triangle are in ratio 3: 4: 5.

Let the angles be 3x, 4x and 5x.

In any triangle, sum of all angles = 180°

$\Rightarrow$ 3x + 4x + 5x = 180°

$\Rightarrow$ 12x = 180°

$\Rightarrow$ x = 15°

So, smallest angle = $3 \times 15^{\circ}$ = 45°

34. **(d)** Area of the rectangle

Explanation: In, Histogram each rectangle is drawn, where width equivalent to class interval and height equivalent to the frequency of the class.

Since class interval are same across the distribution table, area of the rectangle is corresponding to frequency or height of the rectangle

35. **(b)** an acute angle

Explanation: an acute angle

If two angles are complements of each other, that is, the sum of their measures is 90°, then each angle is an acute angle.

36. **(d)** (0, 6)

Explanation: At y-axis the value of x co-ordinate is 0 and y-axis at a distance of 6 units in the positive direction so the co-ordinate of the y-axis is 6.

So the co-ordinate of point is (0, 6).

37. **(b)** 114°

Explanation: It is an iscosceles triangle and hence angles opposite to equal sides are equal

Angle PQR and PRQ will be equal. Let suppose Angle PQR be Y

I.e Y+Y+48=180

= Y = 66

X = 180 - 66 = 114

38. **(a)** $\frac{1}{9}$

Explanation: $\sqrt[4]{(81)^{-2}}$

= $\sqrt[4]{\frac{1}{(81)^2}}$

= $\sqrt[4]{\frac{1}{(9^2)^2}}$

= $\sqrt[4]{\frac{1}{9^4}}$

= $\left(\frac{1}{9}\right)^{4\times\frac{1}{4}}$

= $\frac{1}{9}$

39. **(b)** class size

Explanation: The difference between the upper class limit and the lower class limit is called class size.

40. **(a)** 3

Explanation: from the given frequency distribution table:

$3.5 = \frac{2\times1+3\times2+4\times x+5\times4+6\times5}{2+3+4+5+6}$

$3.5 = \frac{2+6+4x+20+30}{20}$

70 = 4x + 58

4x = 12

x = 3

Section C

41. **(a)** SAS

Explanation: In $\triangle$PQS and $\triangle$PRT

PQ = PR (Given)

QS = TR (Given)

$\angle$PQR = $\triangle$PRQ (corresponding angles of an isosceles $\triangle$)

By SAS congmency

$\triangle$PQS $\cong$ $\triangle$PRT

42. **(b)** Hypotenuse
Explanation: H stands for the hypotenuse.

43. **(d)** 2 sides equal
Explanation: An isosceles △ has 2 sides equal.

44. **(a)** 19 cm
Explanation: Perimeter = sum of all 3 sides
PQ = PR = 6 cm,
QR = 7 cm
So, P = (6 + 6 + 7) cm
= 19 cm

45. **(d)** 50^o
Explanation: let $\angle Q = \angle R = x$ and $\angle P = 80^o$
In $\triangle PQR$, $\angle P + \angle Q + \angle R = 180^o$ (Angle sum property of $\triangle$)
$80^o + x + x = 180^o$
$2x = 180^o - 80$
$2x = 100^o$
$x = \frac{100^\circ}{2}$
$= 50^o$

46. **(d)** 3 miles
Explanation: 3 miles

47. **(b)** 3 miles
Explanation: 3 miles

48. **(c)** 6
Explanation: 6

49. **(a)** 6
Explanation: 6

50. **(b)** (6, 6)
Explanation: (6, 6)