Sample Question Paper - 4
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. $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} + \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}} =$ **[1]**

   a) 8 b) -10

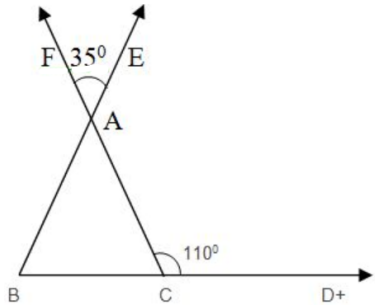
   c) 10 d) -8

2. The equation y = 2x - 7 has **[1]**

   a) no solution b) two solutions

   c) one solution d) many solutions

3. The sides BC, BA and CA of △ABC have been produced to D, E and F respectively, as shown in the give figure, Then, ∠B ? **[1]**



   a) 55° b) 65°

   c) 75° d) 35°

4. Length of perpendicular drawn on smallest side of scalene triangle is **[1]**

   a) largest b) No relation

   c) smallest d) Equal

5. If $\sqrt{10} = 3.162$, then the value of $\frac{1}{\sqrt{10}}$ is **[1]**

   a) 0.3162 b) 31.62

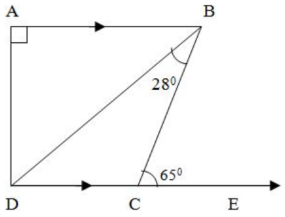
c) 0.003162 d) 3.162

6. x = 5 and y = -2 is the solution of the linear equation. **[1]**

a) x + 3y = 1 b) 2x + y = 9

c) 3x + y = 0 d) 2x – y = 12

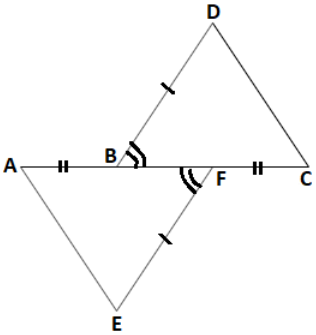
7. In the given figure, AB || DC, ∠BAD = 90°, ∠CBD = 28° and ∠BCE = 65°. Then ∠ABD = ? **[1]**



a) 43° b) 53°

c) 32° d) 37°

8. In the adjoining figure, AB = FC, EF = BD and ∠AFE = ∠CBD. Then the rule by which $\triangle AFE \cong \triangle CBD$ **[1]**



a) SSS b) AAS

c) ASA d) SAS

9. If x = $2+\sqrt{3}$, then $x+\frac{1}{x}$ = **[1]**

a) 4 b) -5

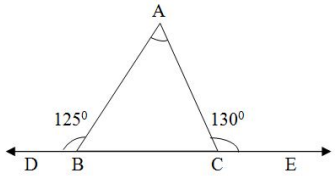
c) -4 d) 5

10. Which one of the following is not the graphical representation of statistical data? **[1]**

a) Histogram b) Cumulative frequency distribution

c) Frequency polygon d) Bar graph

11. Side BC of △ABC has been produced to D on left-hand side and to E on right-hand side such that ∠ABD = 125° and ∠ACE = 130°. Then ∠A = ? **[1]**



a) 55° b) 50°

c) 75° d) 65°

12. If $\left(3^3\right)^2 = 9^x$ then 5^x = ? **[1]**

a) 25 b) 5

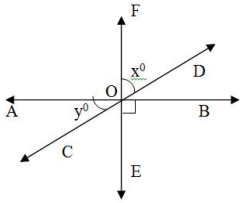
c) 1 d) 125

13. After rationalising the denominator of $\frac{7}{3\sqrt{3}-2\sqrt{2}}$, we get the denominator as **[1]**

a) 5 b) 35

c) 19 d) 13

14. In the adjoining figure, the three lines AB, CD and EF all pass through the point O. If ∠EOB = 90° and x:y = 2:1 then ∠BOD and ∠COE:- **[1]**



a) 60°, 60° b) 30°, 60°

c) 80°, 20° d) 45°, 45°

15. The point on the graph of the linear equation 2x + 5y = 19, whose ordinate is 1½ times its abscissa is **[1]**

a) (-2, -3) b) (2, 3)

c) none of these d) (4, 6)

16. Mode of a set of observations is the value which **[1]**

a) is the sum of the observations b) divides the observations into two equal parts

c) is the mean of the middle two observations d) occurs most frequently

17. The sides of a triangle are 11 m, 60 m and 61 m. The altitude to the smallest side is **[1]**

a) 60 m b) 66 m

c) 11 m d) 50 m

18. The class marks of a frequency distribution are given as follows 15, 20, 25 the class corresponding to the class mark 20 is **[1]**

a) 19.5 - 20.5 b) 12.5 - 17.5

c) 18.5 - 21.5 d) 17.5 - 22.5

19. The simplest rationalising factor of $2\sqrt{5}-\sqrt{3}$,is **[1]**

a) $\sqrt{5}+\sqrt{3}$ b) $2\sqrt{5}+3$

c) $\sqrt{5}-\sqrt{3}$ d) $2\sqrt{5}+\sqrt{3}$

20. AB and CD are two parallel lines. PQ cuts AB and CD at E and F respectively. EL is the bisector of ∠FEB. If ∠LEB = 35°, then ∠CFQ will be **[1]**

a) 130° b) 70°

c) 110° d) 55°

Section B

Attempt any 16 questions

21. If (4, 19) is a solution of the equation y = ax + 3, then a = **[1]**

a) 4 b) 6

c) 3 d) 5

22. The product of difference of semi-perimeter & respective sides of $\triangle ABC$ are given as 13200 m^2.The area of $\triangle ABC$, if its semi-perimeter is 132 m, is given by **[1]**

a) 1320 m^2 b) $13200\ m^2$

c) $132\ m^2$ d) $20\sqrt{33}\ m^2$

23. The point of the form (a, -a), where a lies on **[1]**

a) the x-axis b) the line x = y

c) the line y + x = 0 d) the y-axis

24. Two angles measure $(70 + 2x)^0$ and $(3x – 15)^0$. If each angle is the supplement of the other, then the value of x is : **[1]**

a) 30 b) 20

c) 250^0 d) 25

25. The value of $x - y^{x-y}$ when x = 2 and y = -2, is **[1]**

a) 14 b) -18

c) 18 d) -14

26. Each side of an equilateral triangle is 10 cm long. The height of the triangle is **[1]**

a) $10\sqrt{3}\text{cm}$ b) $10\sqrt{2}\text{cm}$

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

27. The mean of first n natural numbers is **[1]**

a) $\frac{n-1}{2}$ b) $\frac{n(n+1)}{2}$

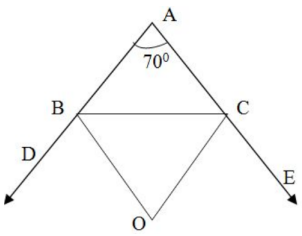
c) $\frac{n+1}{2}$ d) $\frac{n(n-1)}{2}$

28. The value of $\sqrt{20} \times \sqrt{5}$ is **[1]**

a) $20\sqrt{5}$ b) $4\sqrt{5}$

c) $2\sqrt{5}$ d) 10

29. In the adjoining figure, the bisectors of ∠CBD and ∠BCE meet at the point O. If ∠BAC = 70°, then ∠BOC is equal to :- **[1]**



a) 11° b) 55°

c) 70° d) 35°

30. A grouped frequency distribution table with classes of equal sizes using 105-120 (120 not included) as one of the class intervals is constructed for the following data: The number of classes in the distribution will be **[1]**

125	126	140	98	128	78	108	67
87	149	102	136	145	112	103	84
123	130	120	89	103	65	96	65

a) 7 b) 4

c) 5 d) 6

31. Area of an isosceles triangle ABC with AB = a = AC and BC = b is **[1]**

a) $\frac{1}{4}b\sqrt{4a^2-b^2}$ b) $\frac{1}{4}b\sqrt{a^2-b^2}$

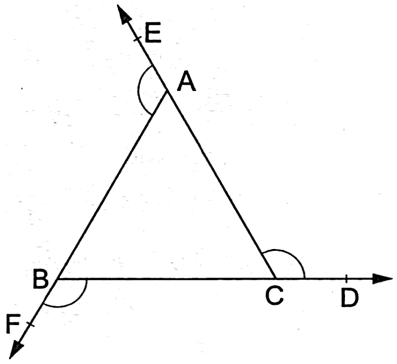
c) $\frac{1}{2}b\sqrt{4a^2-b^2}$ d) $\frac{1}{2}b\sqrt{a^2-b^2}$

32. The value of $\left(x^{a-b}\right)^{a+b} \times \left(x^{b-c}\right)^{b+c} \times \left(x^{c-a}\right)^{c+a}$ is **[1]**

a) 3 b) 2

c) 1 d) 0

33. The sides BC, CA and AB of $\triangle$ABC have been produced to D, E and F respectively. **[1]**
$\angle BAE + \angle CBF + \angle ACD =$?



a) 240^o b) 360^o

c) 300^o d) 320^o

34. Tally are usually marked in a bunch of **[1]**

a) 5 b) 4

c) 3 d) 6

35. If $\angle$A = 4$\angle$B = 6$\angle$C, then A : B : C ? **[1]**

a) 3 : 4 : 6 b) 2 : 3 : 4

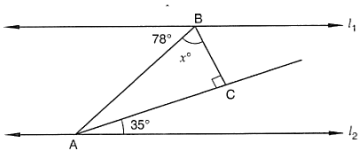
c) 6 : 4 : 3 d) 12 : 3 : 2

36. The line represented by the equation x + y = 16 passes through (2, 14). How many more lines pass through the point (2, 14) **[1]**

a) 10 b) 2

c) many d) 100

37. In figure, for which value of x is $l_1 || l_2$? **[1]**



a) 43 b) 37

c) 45 d) 47

38. The value of $\frac{\sqrt{48}+\sqrt{32}}{\sqrt{27}+\sqrt{18}}$, is **[1]**

a) $\frac{4}{3}$ b) 4

c) 3 d) $\frac{3}{4}$

39. A histogram is a pictorial representation of the grouped data in which class intervals and frequency are respectively taken along **[1]**

a) horizontal axis only b) horizontal axis and vertical axis

c) vertical axis and horizontal axis d) vertical axis only

40. The algebraic sum of the deviations of a set of n values from their mean is: **[1]**

a) n - 1 b) n + 1

c) n d) 0

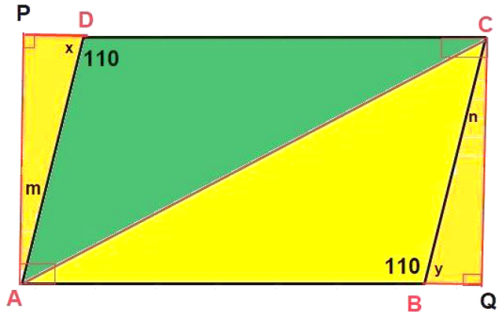
Section C

Attempt any 8 questions

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

In the middle of the city, there was a park ABCD in the form of a parallelogram form so that AB = CD, AB||CD and AD = BC, AD || BC

Municipality converted this park into a rectangular form by adding land in the form of ΔAPD and Δ BCQ. Both the triangular shape of land were covered by planting flower plants.



41. What is the value of $\angle$x? **[1]**

a) 70° b) 100°

c) 90° d) 110°

42. ΔAPD and ΔBCQ are congruent by which criteria? **[1]**

a) ASA b) SSS

c) RHS d) SAS

43. PD is equal to which side? **[1]**

a) BQ b) DC

c) AB d) BC

44. ΔABC and ΔACD are congruent by which criteria? **[1]**

a) ASA b) RHS

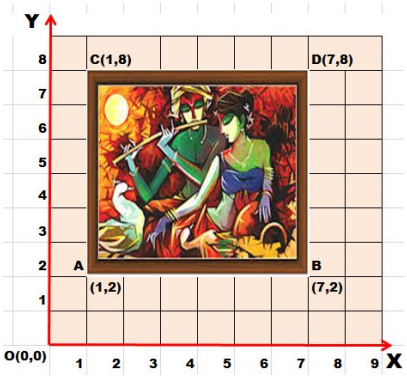
c) SSS d) SAS

45. What is the value of $\angle m$? **[1]**

a) 70° b) 110°

c) 90° d) 20°

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



Rohit was putting up one of his paintings in his living room. Before this Rohit had put a grid on the wall where each unit measured equal to a foot. The upper-left corner of the frame is at point C (1, 8) and the upper-right corner at D (7, 8). The bottom-left corner is at A (1, 2) and the bottom-right corner at B (7, 2).

46. What is the width of the painting plus frame? **[1]**

a) 6 feet b) 9 feet

c) 8 feet d) 5 feet

47. What is the length of the painting plus frame? **[1]**

a) 6 feet b) 9 feet

c) 8 feet d) 5 feet

48. Which sides of the painting are parallel to x-axis? **[1]**

a) Diagonals AD and BC b) AB and CD

c) AC and BD d) No one

49. Which sides of the painting are parallel to y-axis? **[1]**

a) No one b) Diagonals AC and BD

c) AB and CD d) AC and BD

50. Point A, B, C and D lie in which quadrant? **[1]**

a) II b) III

c) I

d) IV

Solution

Section A

1. **(c)** 10

   Explanation: $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} + \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$

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

   $\Rightarrow \frac{(3+2+2\sqrt{6})+3+2-2\sqrt{6}}{3-2}$

   $\Rightarrow 10$

2. **(d)** many solutions

   Explanation: y = 2x - 7

   Has many solution because for different value of x we have different value of y for example.

   At x = 1

   y = 2 (1) - 7

   y = 2 - 7

   y = -5

   at x = 2

   y = 2(2) - 7

   y = 4 - 7

   y = -3

   So we can say for many value of x there is many value of y.

3. **(c)** 75°

   Explanation: ∠FAE = ∠BAC(VOA)

   ∠BAC = 35°

   ∠ACB + ∠ACD = 180° (Linear Pair)

   ∠ACB + 110° = 180°

   ∠ACB = 180° - 110°

   ∠ACB = 70°

   ∠BAC + ∠B + ∠ACB = 180°

   35° + ∠B + 70° = 180°

   ∠B + 105° = 180°

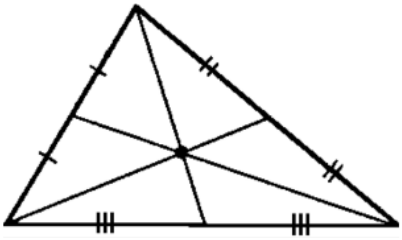
   ∠B 180° - 105°

   ∠B = 75°

4. **(a)** largest

   Explanation:

   Length of the perpendicular drawn on the smallest side of the scalene triangle is largest.

5. **(a)** 0.3162

   Explanation: $\frac{1}{\sqrt{10}}$

   = $\frac{1}{\sqrt{10}} \times \frac{\sqrt{10}}{\sqrt{10}}$

   = $\frac{\sqrt{10}}{10}$

$= \frac{3.162}{10}$
= 0.3162

6. **(d)** 2x – y = 12
Explanation: x = 5 and y = -2 is the solution of the linear equation 2x – y = 12
2x - y = 12
LHS = 2x - y
2.5 - (-2)
10 + 2
12
RHS = 12
LHS = RHS
It means that x = 5 and y = -2 is the solution of the linear equation 2x - y = 12.

7. **(d)** 37°
Explanation: In △DBC
∠BCE = ∠DBC + ∠BDC (Exterior angle property)
65° = 28° + ∠BDC
∠BDC = 37
As, AB is parallel to CD
∠ABD = ∠BDC = 37° (Alternate interior angle)

8. **(d)** SAS
Explanation: In △DBC and △AEF, we have
AB = FC (given)by adding BF on both sides
AF= CB
∠AFE = ∠CBD (given)
EF = BD (given)
Hence, $\triangle AFE \cong \triangle CBD$ by SAS as the corresponding sides and their included angles are equal.

9. **(a)** 4
Explanation: $x + \frac{1}{x}$
$\Rightarrow \frac{x^2+1}{x}$
now, put x = $2 + \sqrt{3}$
we have,
$\frac{(2+\sqrt{3})^2+1}{2+\sqrt{3}}$
$\Rightarrow \frac{4+3+2(2\sqrt{3})+1}{2+\sqrt{3}}$
$\Rightarrow \frac{8+4\sqrt{3}}{2+\sqrt{3}}$
$\Rightarrow \frac{4(2+\sqrt{3})}{2+\sqrt{3}}$
= 4

10. **(b)** Cumulative frequency distribution
Explanation: Technically, a cumulative frequency distribution is the sum of the class and all classes below it in a frequency distribution.

11. **(c)** 75°
Explanation: ∠ABD + ∠ABC = 180° (Linear Pair)
∠ABC = 180^0 - 125° = 55°
∠ACE + ∠ACB = 180° (Linear Pair)
∠ACB = 180° - 130° = 50°
In △ABC
∠ABC + ∠ACB + ∠BAC = 180° (Angle sum property)
∠BAC = 180° - 50° -55°
∠BAC = 75°

12. **(d)** 125

Explanation: $\left(3^3\right)^2 = 9^x$

$(3^2)^3 = 9^x$

$9^3 = 9^x$

$\Rightarrow$ x=3

$\therefore 5^3 = 125$

13. **(c)** 19

Explanation: After rationalizing:

$\frac{7}{3\sqrt{3}-2\sqrt{2}} = \frac{7}{3\sqrt{3}-2\sqrt{2}} \times \frac{3\sqrt{3}+2\sqrt{2}}{3\sqrt{3}+2\sqrt{2}}$

$= \frac{7(3\sqrt{3}+2\sqrt{2})}{(3\sqrt{3})^2-(2\sqrt{2})^2}$

$= \frac{7(3\sqrt{3}+2\sqrt{2})}{27-8}$

$= \frac{7(3\sqrt{3}+2\sqrt{2})}{19}$

14. **(b)** 30°, 60°

Explanation: x + y + 90° = 180° (Linear Pair)

2a + a + 90° = 180° (Since, x:y = 2:1)

a = 30°

x = 2a = $\angle$COE = 60° (Vertically opposite angles)

y = $\angle$BOD = 30° (Vertically opposite angles)

15. **(b)** (2, 3)

Explanation: Ordinate means y-coordinate. It means we need to find a point on the given line where y-coordinte = 3/2 (x-coordinate) . Just put y = [(3/2) .x] in the given eqn.

$2x + 5 \cdot \frac{3}{2}x = 19$

$2x + \frac{15}{2}x = 19$

$\frac{4x+15x}{2} = 19$

$\frac{19x}{2} = 19$

$x = \frac{19\times 2}{19}$

$y = \frac{3}{2}x$

$y = \frac{3}{2} \times 2$

y=3

so the co-ordinate are (2,3)

16. **(d)** occurs most frequently

Explanation: In statistics, the mode in a list of numbers refers to the integers that occurs most number of times.

17. **(a)** 60 m

Explanation: Area of $\Delta = \frac{1}{2}$ Base $\times$ Height

The smallest side is 11 m

Area = $\frac{1}{2} \times 11 \times$ Height .. (i)

Area by Heron's Formula = $\sqrt{s(s-a)(s-b)(s-c)}$

s $\frac{11+60+61}{2}$ = 66 m

Area = $\sqrt{66 \times 55 \times 6 \times 5}$ = 330 m^2

From eq (i)

330 = $\frac{1}{2} \times 11 \times$ height

Height = $\frac{2\times 330}{11}$ = 60 m

18. **(d)** 17.5 - 22.5

Explanation: Clearly, Lower limit of the class corresponding to class mark 20 = $\frac{\text{Class mark of preceding class}+20}{2}$

$= \frac{15+20}{2} = 17.5$

Upper limit of the class corresponding to the class mark 20 = $\frac{20+\text{Class mark of succeeding class}}{2}$

$= \frac{20+25}{2} = \frac{45}{2} = 22.5$

Hence the required class is 17.5 - 22.5

19. **(d)** $2\sqrt{5}+\sqrt{3}$

Explanation: $2\sqrt{5}-\sqrt{3}$

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

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

= 20 - 3

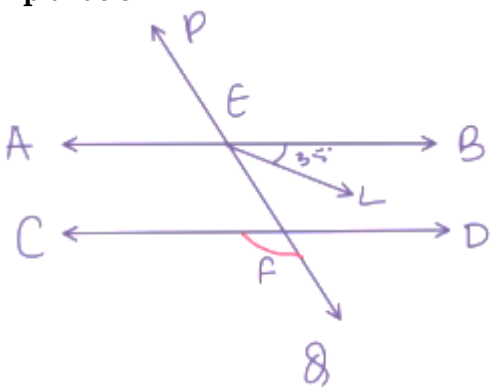
= 17

17 is rational number

$\because$ rationalizing factor of $2\sqrt{5}-\sqrt{3}$ is $2\sqrt{5}+\sqrt{3}$

20. **(c)** 110°

Explanation:



It is given that, AB||CD with PQ as transversal.

Also, EL is the bisector $\angle BEF$ and $\angle LEB$ = 35°

We need to find $\angle CFQ$

Therefore,

$\angle BEF = 2(\angle LEB)$

$\angle \text{BEF} = 2\,(35^\circ)$

$\angle BEF = 70^\circ$ .... (i)

We have $\text{AB}||\text{CD}$, $\angle BEF$ and $\angle DFE$ are consecutive interior angles, which must be supplementary.

$\angle BEF + \angle DFE = 180^\circ$

From equation (i), we get:

$70^\circ + \angle DFE = 180^\circ$

$\angle DFE = 180^\circ - 70^\circ$

$\angle DFE = 110^\circ$ .... (ii)

We have $\angle \text{CFQ}$ and $\angle \text{DFE}$ as vertically opposite angles.

Therefore,

$\angle \text{CFQ} = \angle \text{DFE}$

$\angle CFQ = 110^\circ$

Section B

21. **(a)** 4

Explanation: Given, (4, 19) is a solution of the equation *y*=*ax*+3

=19 = 4a + 3

= a = 4

22. **(a)** 1320 m^2

Explanation: Given: $(s-a)(s-b)(s-c) = 13200$ m and s = 132 m

Area of triangle = $\sqrt{s(s-a)(s-b)(s-c)}$

= $\sqrt{13200 \times 132}$

= 1320 sq. m

23. **(c)** the line y + x = 0
Explanation: The point (a ,-a) lies on line x + y = 0
Here is the verification
Put x = a in equation
x + y = 0
a + y = 0
y = -a
Hence it is prove that (a,-a) is a solution of x + y = 0

24. **(d)** 25
Explanation: 70 + 2x + 3x - 15 = 180 (Supplimentary angles)
5x = 180 - 55
x = 25

25. **(d)** -14
Explanation: x = 2, y = -2
$x - y^{x-y} = 2 - (-2)^{2-(-2)}$
$= 2 - (-2)^{2+2}$
$= 2 - (-2)^4$
= 2- (+16)
= 2 - 16
= -14

26. **(c)** $5\sqrt{3}$cm
Explanation: Height of equilateral triangle $= \frac{\sqrt{3}}{2} \times$ Side
$= \frac{\sqrt{3}}{2} \times 10$
$= 5\sqrt{3}$cm

27. **(c)** $\frac{n+1}{2}$
Explanation: The mean is equal to the sum of all the values in the data set divided by the number of values in the data set.
Sum of first n natural numbers is $\frac{n(n+1)}{2}$
So, mean of first n natural numbers is $\frac{\frac{n(n+1)}{2}}{n}$ = $\frac{(n+1)}{2}$

28. **(d)** 10
Explanation: $\sqrt{20} \times \sqrt{5}$
= $2\sqrt{5} \times \sqrt{5}$
= 2×5
=10

29. **(b)** 55°
Explanation: $\angle$BOC = 90° - $\frac{1}{2}$ $\angle$BAC
$\angle$BOC = 90° - 35° = 55°

30. **(d)** 6
Explanation: Maximum value of the observation is 149 & minimum value is 65.
This range of data need to grouped into classes of equal sizes with 105-120 as one class.
Thus we need to construct classes of width 15.
Below 6 classes can be constructed
60-75, 75-90, 90-105, 105-120, 120-135, 135-150

31. **(a)** $\frac{1}{4}b\sqrt{4a^2 - b^2}$
Explanation: Here s = $\frac{a+a+b}{2} = \frac{2a+b}{2}$
Area of triangle = $\sqrt{s(s-a)(s-b)(s-c)}$
= $\sqrt{\frac{2a+b}{2}\left(\frac{2a+b}{2} - a\right)\left(\frac{2a+b}{2} - a\right)\left(\frac{2a+b}{2} - b\right)}$

$= \sqrt{\frac{2a+b}{2}\left(\frac{b}{2}\right)\left(\frac{b}{2}\right)\left(\frac{2a-b}{2}\right)}$

$= \frac{b}{4}\sqrt{4a^2-b^2}$

32. **(c)** 1

Explanation: $\left(x^{a-b}\right)^{a+b} \times \left(x^{b-c}\right)^{b+c} \times \left(x^{c-a}\right)^{c+a}$

$\Rightarrow x^{a^2-b^2} \times x^{b^2-c^2} \times x^{c^2-a^2}$

$\Rightarrow x^{a^2-b^2+b^2-c^2+c^2-a^2}$

$\Rightarrow x^0 = 1$

33. **(b)** 360^o

Explanation: We have :

$\angle 1 + \angle BAE = 180^\circ$ ....(i)

$\angle 2 + \angle CBF = 180^\circ$.....(ii)

$\angle 3 + \angle ACD = 180^\circ$.....(iv)

Adding (i),(ii) and (iii), we get:

$(\angle 1 + \angle 2 + \angle 3) + (\angle BAE + \angle CBF + \angle ACD) = 540^\circ$

$\Rightarrow 180^\circ + \angle BAE + \angle CBF + \angle ACD = 540^\circ$ [$\because \angle 1 + \angle 2 + \angle 3 = 180^\circ$]

$\Rightarrow \angle BAE + \angle CBF + \angle ACD = 360^\circ$.

34. **(a)** 5

Explanation: Tally are usually marked in a bunch of 5: 4 in a vertical line and one is placed diagonally.

35. **(d)** 12 : 3 : 2

Explanation: Let A be x

B = $\frac{1}{4}$x

C = $\frac{1}{6}$ x

A : B : C

x : $\frac{1}{4}$x : $\frac{1}{6}$ x

LCM of 4 and 6 is 12

12 : 3 : 2

36. **(c)** many

Explanation: There are many lines pass through the point (2, 14).

For example

x - y = -12

2x + y = 18

and many more.

37. **(d)** 47

Explanation: Let if $l_1 || l_2$ and AB is tranverse to it

Then,

$\angle$PBA should be equal to $\angle$BAS (Alternate angles)

So if $l_1 || l_2$, then $\angle$BAS = 70^o

$\Rightarrow \angle \text{BAC} = 78^o - 35^o = 43^o$..(i)

Now, in $\triangle \text{ABC}$

$x^o + \angle C + \angle BAC = 180^o$

$\Rightarrow x^o + 90^o + 43^o = 180^o$

$\Rightarrow x^o = 180^o - 90^o - 43^o = 47^o$

$\Rightarrow x^o = 47^o$

So if $x^o = 47^o$ then $l_1 || l_2$

38. **(a)** $\frac{4}{3}$

Explanation: $\frac{\sqrt{48}+\sqrt{32}}{\sqrt{27}+\sqrt{18}}$

$= \frac{\sqrt{4\times4\times3}+\sqrt{4\times4\times2}}{\sqrt{3\times3\times3}+\sqrt{3\times3\times2}}$

$= \frac{4\sqrt{3}+4\sqrt{2}}{3\sqrt{3}+3\sqrt{2}}$

$= \frac{4(\sqrt{3}+\sqrt{2})}{3(\sqrt{3}+\sqrt{2})}$

$= \frac{4}{3}$

39. **(b)** horizontal axis and vertical axis
Explanation: In a histogram the class limits are marked on the horizontal axis and the frequency is marked on the vertical axis. Thus, a rectangle is constructed on each class interval.

40. **(d)** 0
Explanation: If $\overline{X}$ be the mean of the n observations q X_i, ..., X_n then we have

$\overline{X} = \frac{1}{n}\sum_{i=1}^{n} X_i$

$\Rightarrow \sum_{i=1}^{n} X_i = n\bar{X}$

Let $\overline{X}$ be the mean of n values X_i, ..., X_n. So, we have

$\overline{X} = \frac{1}{n}\sum_{i=1}^{n} X_i$

$\Rightarrow \sum_{i=1}^{n} X_i = n\bar{X}$

The sum of the deviations of n values X_i, ..., X_n from their mean $\overline{X}$ is

$(x_1 - \overline{X}) + (x_2 - \overline{X}) + ...+ (x_n - \overline{X})$

$= \sum_{i=1}^{n} \left(x_i - \bar{X}\right)$

$= \sum_{i=1}^{n} x_i - \sum_{i=1}^{n} \bar{X}$

$= n\overline{X} - n\overline{X}$

= 0

Section C

41. **(a)** 70°
Explanation: 70°

42. **(a)** ASA
Explanation: ASA

43. **(a)** BQ
Explanation: BQ

44. **(c)** SSS
Explanation: SSS

45. **(d)** 20°
Explanation: 20°

46. **(a)** 6 feet
Explanation: 6 feet

47. **(a)** 6 feet
Explanation: 6 feet

48. **(b)** AB and CD
Explanation: AB and CD

49. **(d)** AC and BD
Explanation: AC and BD

50. **(c)** I
Explanation: I