Goa Board
Class VIII Mathematics
Sample Paper – 5 Solution

Time: 3 hours **Total Marks: 90**

Section A

1. Correct answer: C
   The area of a square with side a = a^2
   So, $a^2 = 324$
   $a = \sqrt{324} = 18$ units

2. Correct answer: D

   Sum of digits at odd places = 7 + 8 + 3 = 18

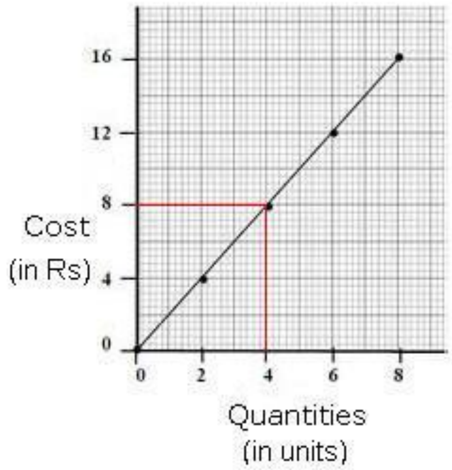
   Sum of digits at even places = 1 + 5 + 1 = 7

   Difference = 18 - 7 = 11

   Since, 11 is divisible by 11.

   Hence, 718531 is divisible by 11.

3. Correct answer: A



   From the graph, it is clear that the cost of 4 units is Rs. 8.

4. Correct answer: B
   Cube root of (-8) × (-343) × (125)= (-2) × (-7) × 5 = 70

5. Correct answer: C
   At x = 3, y = 2(3) + 5 = 6 + 5 = 11.

6. Correct answer: D
   The given expression can be simplified as
   $3^{k+1} \times 27^2 = 9^4$
   $3^{k+1} \times (3^3)^2 = (3^2)^4$
   $3^{k+1} \times 3^6 = 3^8$
   $3^{k+1+6} = 3^8$
   $3^{k+7} = 3^8$
   Since, bases are equal, comparing powers, we get,
   $k + 7 = 8$
   $k = 1$

7. Correct answer: B
   20% of x= $\frac{20}{100}x = \frac{x}{5}$

8. Correct answer: C
   The given shape has 12 edges.

Section B

9. We have:

   $(a + b)^2 = a^2 + b^2 + 2ab$Taking, a = -20 and b = -5, we get

   $(-25)^2 = \{-20 + (-5)\}^2$

   $= (-20)^2 + (-5)^2 + 2(-20)(-5)$

   = 400 + 25 + 200 = 625

10. From the graph, it is clear that 5 students favoured orange and 1 student favoured the green colour.
    Now, 5 – 1 = 4
    Therefore, 4 more students favoured orange colour more than green.

11. Let the required number be x. Then

26% of x = 65

$$\frac{26}{100}\times(x)=65$$
$$\Rightarrow x=\left(65\times\frac{100}{26}\right)=250$$

Hence, the required number is 250.

12. Resolving 4096 into factors, we get

$4096 = (2\times 2\times 2)\times(2\times 2\times 2)\times(2\times 2\times 2)\times(2\times 2\times 2) = (2\times 2\times 2\times 2)^3 = (16)^3$

Thus, $4096 = 16\times 16\times 16$

Hence, $-4096 = (-16)\times(-16)\times(-16)$

Therefore the cube root of -4096 = -16.

13. It is clear that if more girls join the hostel the food will last for less number of days. So, it is a case of inverse variation.

Writing the given values in a table, we have

Number of girls	40	60
Number of days	30	x

Now in case of inverse variation, the product of quantities will remain same. Therefore,

$$40\times30=60\times(x)$$
$$\Rightarrow x=\frac{40\times30}{60}=20$$

Hence, the food will last for 20 days.

14. We have,

Number of vertices (V) = 8
Number of edges (E) = 12
Let, number of faces = F
Since every polyhedron satisfy Euler's formula, therefore
F + V = E + 2
Or, F + 8 = 12 + 2
Or, F = 14 - 8 = 6
Hence, the number of faces are 6.

Section C

15. i) $1\frac{2}{3}=\frac{5}{3}$

$$\left(1\frac{2}{3}\right)^3=\left(\frac{5}{3}\right)^3=\frac{5^3}{3^3}=\frac{5\times5\times5}{3\times3\times3}=\frac{125}{27}$$

ii) $0.06=\frac{6}{100}$

$$\left(\frac{6}{100}\right)^3=\left(\frac{3}{50}\right)^3=\frac{3^3}{50^3}=\frac{3\times3\times3}{50\times50\times50}=\frac{27}{125000}$$

iii) $-\frac{2}{3}$

$$\left(\frac{-2}{3}\right)^3=\frac{(-2)^3}{3^3}=\frac{(-2)\times(-2)\times(-2)}{3\times3\times3}=\frac{-8}{27}$$

16. Let the number be x, then $x \times x = 549081$

Or, $x^2 = 5490801$

$x = \sqrt{549081}$

Now, by long division method, we have

	741
7	549081
	49
144	590
	576
	1481
	1481
	0

This gives x = 741

Hence, the number is 741.

17. $\text{SI(borrowing)} = \text{Rs.}\dfrac{5000 \times 4 \times 2}{100} = Rs.\ 400$

$$\text{SI(lending)} = \text{Rs.}\dfrac{5000 \times \dfrac{25}{4} \times 2}{100} = Rs.\ 625$$

Gain = Rs (625 - 400) = Rs. 225

Therefore, gain per year = $\text{Rs.}\left(\dfrac{225}{2}\right) = \text{Rs. } 112.50$

18. Side of square = 6 cm

Thus, Area of square = $6 \times 6 = 36\ cm^2$

Since, area of rhombus = Area of square

Therefore, area of rhombus = $36\ cm^2$

$$\Rightarrow \frac{1}{2} \times 4 \times d = 36$$

As one diagonal is 4 cm.

$$\Rightarrow d = \frac{36}{2} = 18 cm$$

Hence, the length of other diagonal is 18 cm.

19. Let the angles of the given quadrilateral be $(2x)^o$, $(3x)^o$, $(5x)^o$ and $(8x)^o$.

$\therefore 2x + 3x + 5x + 8x = 360$

(As the sum of angles of quadrilateral is 360^o)

$\Rightarrow 18x = 360$

$\Rightarrow x = 20$

So, the angles of the given quadrilateral are $(2 \times 20)^o$, $(3 \times 20)^o$, $(5 \times 20)^o$ and (8×20), i.e. 40^o, 60^o, 100^o and 160^o.

20. We have to follow the following steps to construct the square:

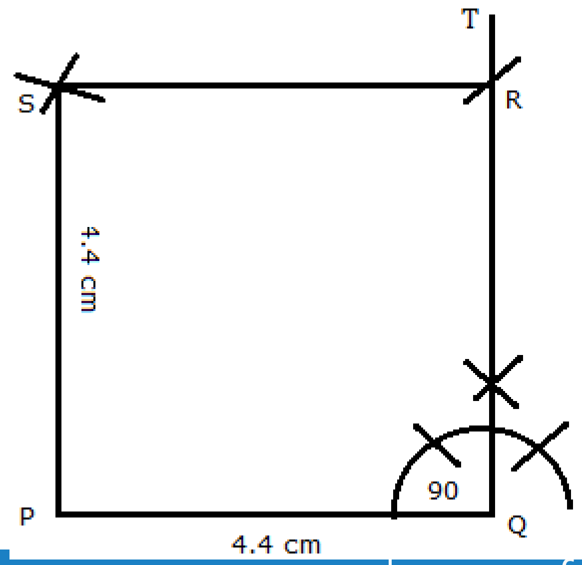
i) Draw PQ = 4.4 cm.

ii) Construct ∠PQT = 90° at Q.

iii) From QT cut off QR = 4.4 cm.

iv) From P and R, draw two arcs of radii 4.4 cm each to cut each other at S.

v) Join PS and RS.



PQRS is the required square.

21. Consider:

$$20x-[15x^3+5x^2-\{8x^2-(4-2x-x^3)-5x^3\}-2x]$$
$$=20x-[15x^3+5x^2-\{8x^2-4+2x+x^3-5x^3\}-2x]$$
$$=20x-[15x^3+5x^2-\{8x^2-4+2x-4x^3\}-2x]$$
$$=20x-[15x^3+5x^2-8x^2+4-2x+4x^3-2x]$$
$$=20x-[19x^3-3x^2+4-4x]$$
$$=20x-19x^3+3x^2-4+4x$$
$$=-19x^3+3x^2+24x-4$$

22. We have,

$$3^{5x-1}\times 3^{2x+15}$$
$$\Rightarrow 3^{(5x-1)}\times 3^{(2x+15)}=1$$
$$\Rightarrow 3^{5x-1+2x+15}=1$$
$$\Rightarrow 3^{7x+14}=3^0$$

Since, bases are equal, powers are also equal.

$$\therefore 7x+14=0$$
$$\Rightarrow 7x=-14$$
$$\Rightarrow x=\frac{-14}{7}=-2$$

23. Since, y + 2 is a factor of $4y^4 + 2y^3 - 3y^2 + 8y + 5a$, the remainder will be zero.

Using Long Division, we have

$$\begin{array}{r l}
 & 4y^3 - 6y^2 + 9y - 10 \\
y+2 \,\big) & 4y^4 - 2y^3 - 3y^3 + 8y + 5a \\
 & {}_{(-)}\, 4y^4 + 8y^3 \\
\hline
 & -6y^3 - 3y^2 + 8y + 5a \\
 & {}_{(-)}\, -6y^3 - 12y^2 \\
\hline
 & 9y + 8y + 5a \\
 & {}_{(-)}\, 9y + 18y \\
\hline
 & -10y + 5a \\
 & {}_{(-)}\, -10y - 20 \\
\hline
 & 5a + 20
\end{array}$$

$$Now, 5a + 20 = 0$$
$$\Rightarrow 5a = -20$$
$$\Rightarrow a = -4$$

24. Let the number be x.

One-fourth of it is less than one-third of it by 4:

$$\frac{x}{4} + 4 = \frac{x}{3}$$
$$\Rightarrow \frac{x+16}{4} = \frac{x}{3}$$
$$\Rightarrow 12\left(\frac{x+16}{4}\right) = 12 \times \frac{x}{3}$$

3x + 48 = 4x

3x - 4x = -48

x = 48

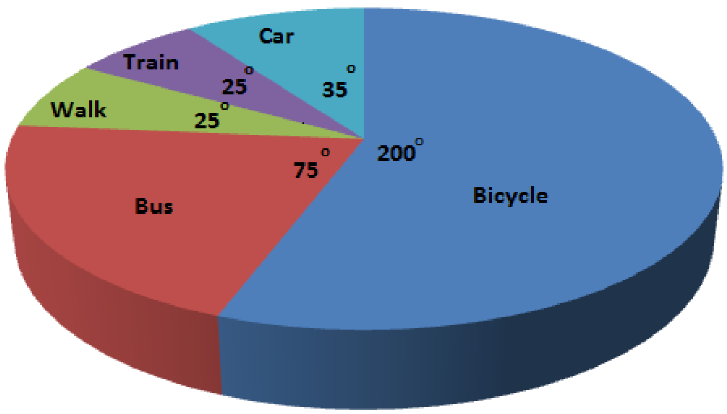
The number is 48.

Section D

25.

Mode of transport	Number of students	Measure of the central angle
Bicycle	800	$\frac{800}{1440} \times 360° = 200°$
Bus	300	$\frac{300}{1440} \times 360° = 75°$
Walk	100	$\frac{100}{1440} \times 360° = 25°$
Train	100	$\frac{100}{1440} \times 360° = 25°$
Car	140	$\frac{140}{1440} \times 360° = 35°$
Total	**1440**	**360°**

Based on the table, the pie diagram is drawn:



26.

I) 3^{rd} year

II) 700

III) Total number of students admitted in 1^{st} and 2^{nd} year= 900 + 1000 = 1900

IV) 4^{th}

27. Let the smallest side of the triangle be x cm.

From the given information,

$$x = \frac{1}{3}(\text{Biggest side} - 5)$$

Biggest side = 3x + 15

Also, $x = \frac{1}{2}(\text{third side} - 3)$

Third side = 2x + 6

Perimeter of triangle = Smallest side + biggest side + third side

Perimeter = x + (3x + 15) + (2x + 6) = 39

$\Rightarrow 6x + 21 = 39$

$\Rightarrow 6x = 39 - 21$

$\Rightarrow 6x = 18$

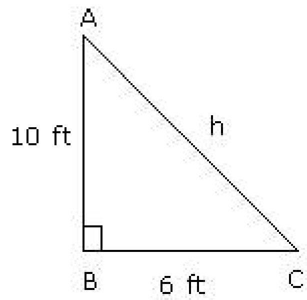
x = 3

Smallest side = 3 cm

Biggest side = 3x + 15 = (3 × 3) + 15 = 24 cm

Third side = 2x + 6 = (2 × 3) + 6 = 12 cm.

28.



In the figure, AC is the ladder, AB is the wall.

Using Pythagoras theorem, we have:

$$h^2 = 10^2 + 6^2$$
$$\therefore h^2 = 100 + 36 = 136$$
$$\therefore h = \sqrt{136}\,ft$$

Now, we know that 121 < 136 < 144

Thus, 11 < $\sqrt{136}$ < 12

Also, 136 is closer to 144 than 121.

Thus, nearest whole number to which $\sqrt{136}$ can be approximate is 12.

Thus, the required approximate length of the ladder is 12 feet.

29. Steps of Construction:

(i) Draw AB = 3 cm.

(ii) With A as centre and radius 3.8 cm, draw an arc.

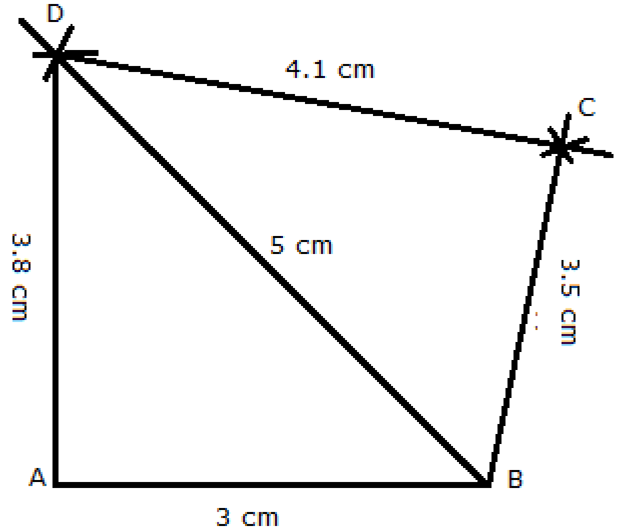
(iii) With B as centre and radius 5 cm, draw another arc intersecting the arc of Step 2 in D.

(iv) Join AD and BD.

(v) With B and D as centres and radii 3.5 cm and 4.1 cm, respectively, draw two arcs intersecting each other at C.

(iv) Join BC and DC.

ABCD is the required quadrilateral.



30. The cost of 6 balls is Rs. 42.

We know that as the number of balls increases, the cost increases. Thus, they are directly proportional.

Let the cost of 10 balls, 15 balls and 20 balls be x, y, and z, respectively.

Quantity	6	10	15	20
Cost (in Rs)	42	x	y	z

In case of direct proportion, the ratio of the two quantities remains constant.

Therefore,

$$\frac{6}{42}=\frac{10}{x}=\frac{15}{y}=\frac{20}{Z}$$

On solving, we get,

x = 70

y = 105

z = 140

Thus, we have:

Quantity	10	15	20
Cost (in Rs)	70	105	140

31. X and Y can paint the house in 18 days $\Rightarrow$ (X + Y)'s 1 day's work $= \frac{1}{18}$

Y and Z can paint the house in 24 days $\Rightarrow$ (Y + Z)'s 1 day's work $= \frac{1}{24}$

X and Z can paint the house in 36 days $\Rightarrow$ (X + Z)'s 1 day's work $= \frac{1}{36}$

Adding, we get

2(X+Y+Z)'s 1 day's work $= \frac{1}{18} + \frac{1}{24} + \frac{1}{36} = \frac{4+3+2}{72} = \frac{9}{72} = \frac{1}{8}$

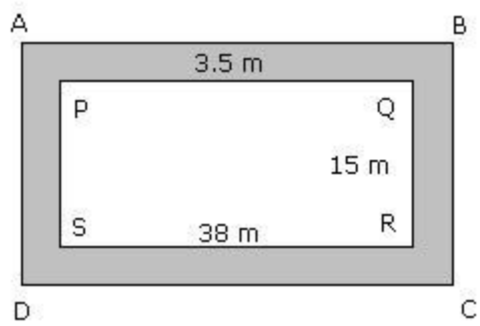
Thus, (X + Y + Z)'s 1 day's work $= \frac{1}{2 \times 8} = \frac{1}{16}$

Y's 1 day's work = [(X + Y + Z)'s 1 day's work] - [(X + Z)'s 1 day's work]

$= \frac{1}{16} - \frac{1}{36} = \frac{9-4}{144} = \frac{5}{144}$

Hence, Y alone can paint the house in $\left(\frac{144}{5}\right) = 28\frac{4}{5}$ days.

32. The above data can be shown in a figure as follows:



Let PQRS represent the rectangular park and the shaded region represent the path 3.5 m wide.

Thus, to find the length AB and breadth BC, we have to add 3.5 m to both sides of rectangular park whose dimensions are 38 × 15

So, the length and breadth of the path are as shown below:

Length AB = (38 + 3.5 + 3.5) m = 45 m

Breadth BC = (15 + 3.5 + 3.5) m = 22 m

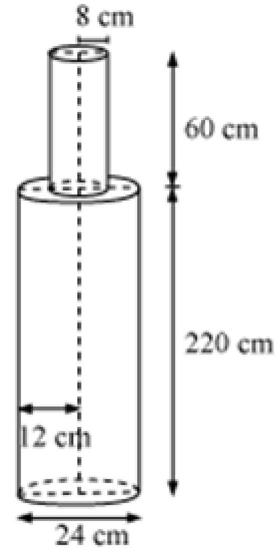
So, perimeter of the path = 2 × (l + b)

= 2 × (45 + 22)

= 2 × 67 = 134 m

Thus, perimeter of the path is 134 m.

33. From the figure, we have



Height (h_1) of larger cylinder = 220 cm

Radius (r_1) of larger cylinder = $\frac{24}{2}$ = 12 cm

Height (h_2) of smaller cylinder = 60 cm

Radius (r_2) of smaller cylinder = 8 cm

$$\begin{aligned}\text{Total volume of pole } &= \pi r_1^2 h_1 + \pi r_2^2 h_2 \\ &= \pi(12)^2 \times 220 + \pi(8)^2 \times 60 \\ &= \pi[144 \times 220 + 6460] \\ &= 35520 \times 3.14 \\ &= 1,11,532.8 cm^3\end{aligned}$$

Mass of 1 cm^3 iron = 8 g

Mass of 111532.8 cm^3 iron = 111532.8 × 8 = 892262.4 g = 892.262 kg

34. Steps of construction:

a) Draw AB =3.8cm.

b) Draw $\angle XBA = 80°$.

c) Taking B as centre, draw an arc of radius 3.4 cm on BX cutting BX at point C.

d) With C as centre and radius equal to 4.5 cm, draw an arc.

e) With A as centre and radius equal to 4 cm, draw another arc to cut the drawn arc in step (d) at D.

f) Join DC and DA.

ABCD is the required quadrilateral.