

Goa Board
Class VIII Mathematics
Sample Paper – 1 Solution

Time: 3 hours

Total Marks: 90

Section A

1. Correct option : A

$$\sqrt{\frac{196}{484}} = \frac{\cancel{2}^1 \times 7}{\cancel{2}^1 \times 11} = \frac{7}{11}$$

2. Correct option: B

For a pentagonal pyramid, F = 6, V = 6

Applying Euler's formula: F + V - E = 2

$$E = F + V - 2$$

$$E = 6 + 6 - 2$$

$$E = 10$$

3. Correct option: B

Cube root of the number $46656 = 2 \times 2 \times 3 \times 3 = 36$

4. Correct option: A

$$\text{Lateral surface area of cylinder} = 2\pi rh = 2 \times \frac{22}{7} \times \frac{35}{5} \times 6 = 66 \text{ sq.m}$$

5. Correct option: B

$$\frac{14}{22} = \frac{441}{x}$$

$$\Rightarrow x = \frac{22 \times 441}{14} = \text{Rs.}693$$

6. Correct option: D

$$\frac{2b+5}{3b+7} = \frac{3}{5}$$

$$\Rightarrow 10b + 25 = 9b + 21$$

$$\Rightarrow b = -4$$

7. Correct option: D

Each of the three expressions have minimum 2 powers of x, 3 powers of y and 1 power of z, so the greatest common factor of the three expressions is x^2y^3z .

8. Correct option: B

$$\frac{16y-8}{13y-2} = 1$$

$$\Rightarrow 16y - 8 = 13y - 2$$

$$\Rightarrow 16y - 13y = -2 + 8$$

$$\Rightarrow 3y = 6$$

$$\Rightarrow y = \frac{6}{3}$$

$$\Rightarrow y = 2$$

Section B

(Questions 8 to 11 carry 2 marks each)

9. (i) Given number 1956.

$$\text{Sum of digits} = 1 + 9 + 5 + 6 = 21$$

Since 21 is divisible by 3.

Therefore, 1956 is also divisible by 3.

(ii) Given number 15693.

$$\text{Sum of digits} = 1 + 5 + 6 + 9 + 3 = 24$$

Since 24 is divisible by 3.

Hence, the number 15693 is divisible by 3.

10. We have

$$12xy - 15x$$

$$= 2 \times 2 \times 3 \times x \times y - 3 \times 5 \times x$$

$$= 3 \times x (2 \times 2 \times y - 5)$$

$$= 3x(4y - 5)$$

11. Let the greater part be x .

∴ The lesser part is $40 - x$.

According to the question, $\frac{1}{2}$ of the lesser part = $\frac{1}{3}$ of the greater part

$$\frac{1}{3}x = \frac{1}{2}(40 - x)$$

$$\Rightarrow 2x = 3(40 - x)$$

$$\Rightarrow 2x = 120 - 3x$$

$$\Rightarrow 5x = 120$$

$$\Rightarrow x = \frac{120}{5} = 24$$

The two parts are 24 and 16.

12. We have,

Number of vertices (V) = 8

Number of edges (E) = 12

Let, number of faces = F

Since every polyhedron satisfies Euler's formula,

$$F + V = E + 2$$

$$\text{Or, } F + 8 = 12 + 2$$

$$\text{Or, } F = 14 - 8 = 6$$

Hence the numbers of faces are 6.

13. Let A and B be the two numbers such that

$$40\% \text{ of } A = \frac{2}{3}B$$

Then,

$$\frac{40A}{100} = \frac{2B}{3}$$

$$\Rightarrow \frac{2A}{5} = \frac{2B}{3}$$

$$\Rightarrow \frac{A}{B} = \left(\frac{2}{3} \times \frac{5}{2}\right) = \frac{5}{3}$$

$$\therefore A : B = 5 : 3$$

14. Here, $n(S) = 10 + 25 = 35$

Let E be the event of getting a prize.

$$n(E) = 10$$

$$\Rightarrow P(E) = \frac{n(E)}{n(S)} = \frac{10}{35} = \frac{2}{7}$$

$$\text{Probability of getting a prize} = \frac{2}{7}$$

Section C

15.

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

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

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

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

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

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

16. 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	10	15	20
Cost (in Rs)	70	105	140

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

In the 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:

17. The shape of well will be cylindrical.

Depth (h) of well = 20 m

Radius (r) of circular end of well = $\frac{7}{2}$ m

Area of platform = length \times breadth = 22×14 m²

Volume of earth dug from well will be equal to the Volume of earth scattered on platform.

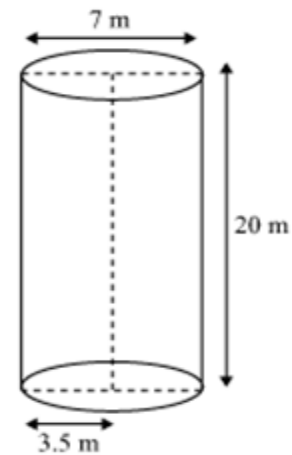
Volume of earth from well = volume of earth used to make such platform

$$\pi r^2 h = \text{Area of platform} \times \text{Height of platform}$$

$$\Rightarrow \pi \times \left(\frac{7}{2}\right)^2 \times 20 = 22 \times 14 \times h$$

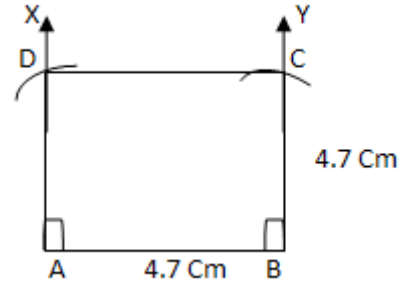
$$\Rightarrow h = \frac{22}{7} \times \frac{49}{4} \times \frac{20}{22 \times 14} = \frac{5}{2} \text{ m}$$

\therefore Height of platform = 2.5 m



18. Steps of construction:

- a) Draw $AB = 4.7\text{cm}$.
- b) Draw $\angle XAB = 90^\circ$ and $\angle YBA = 90^\circ$.
- c) With A as centre and radius 4.7cm , draw an arc which cuts AX at D.
- d) With B as centre and radius 4.7cm , draw an arc which cuts BY at C.
- e) Join DC.



ABCD is the required square

19. In the first circle, we have

$$6 \times 2 + 1 = 13,$$

$$13 \times 2 + 1 = 27.$$

In the second circle, we have

$$7 \times 2 + 1 = 15,$$

$$15 \times 2 + 1 = 31$$

Therefore, in third circle, we must have

$$8 \times 2 + 1 = 17,$$

$$17 \times 2 + 1 = 35.$$

Hence, the value of x is 35.

20. We have

$$9x^2 - 36 = 9(x^2 - 4) = 9(x^2 - 2^2) = 9(x - 2)(x + 2)$$

Therefore,

$$\frac{9x^2 - 36}{3(x + 2)} = \frac{9(x - 2)(x + 2)}{3(x + 2)} = 3(x - 2)$$

Hence, the answer is $3(x - 2)$.

21. Given number are 2.54×10^{12} and 5.24×10^{14}

To find the sum, first we express the numbers with same power of 10.

Consider,

$$5.24 \times 10^{14} = 5.24 \times 10^{2+12} = 5.24 \times 10^2 \times 10^{12} = 524 \times 10^{12}$$

Therefore,

$$\begin{aligned} & 2.54 \times 10^{12} + 5.24 \times 10^{14} \\ &= 2.54 \times 10^{12} + 524 \times 10^{12} \\ &= (2.54 + 524) 10^{12} \\ &= 526.54 \times 10^{12} \\ &= 5.2654 \times 10^2 \times 10^{12} \\ &= 5.2654 \times 10^{14} \end{aligned}$$

22. Let the son's age be x years.

∴ Mr. Ranjan's age is $7x$ years.

After 10 years, his son's age will be $= (x + 10)$ years

After 10 years, Mr. Ranjan's age will be $= (7x + 10)$ years

By the given condition,

$$(7x + 10) = 3(x + 10)$$

$$\Rightarrow 7x + 10 = 3x + 30$$

$$\Rightarrow 7x - 3x = 30 - 10$$

$$\Rightarrow 4x = 20 \text{ or } x = 5$$

∴ Son's age is 5 years.

Mr. Ranjan's age is $7 \times 5 = 35$ years

23. (i) $458000 = 4.58 \times 100000 = 4.58 \times 10^5$.

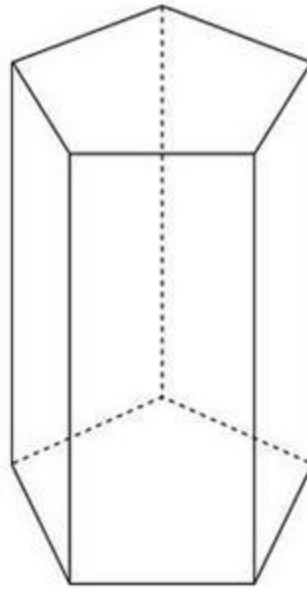
(ii) $1780000 = 1.78 \times 1000000 = 1.78 \times 10^6$.

(iii) $85000 = 8.5 \times 10000 = 8.5 \times 10^4$.

24. Euler's Formula:

For a polyhedron having F number of faces, E number of edges and V number of vertices, we have $F + V = E + 2$.

The pentagonal prism looks like:



Here, number of faces (F) = 7

Number of edges (E) = 15

And number of vertices (V) = 10

Now, $F + V = 7 + 10 = 17$

$E + 2 = 15 + 2 = 17$

Thus, $F + V = E + 2$

Hence, Euler's formula is verified.

Section D

25. Total money: Rs. 10800

To work out the angle of each segment, work out the fraction of the total that each item got.

Start with food: $\frac{3150}{10800}$

There are 360° in a full turn, so to work out the angle, multiply the fraction by 360:

$$\frac{3150}{10800} \times 360^\circ = 105^\circ$$

The food sector has an angle of 105°

Repeat this process to find the angle of the segments for the other items.

Once you have calculated the angles of the segments, construct the pie chart

Item	Amount	Central Angle
Food	3150	$\frac{3150}{10800} \times 360^\circ = 105^\circ$
Rent	2100	$\frac{2100}{10800} \times 360^\circ = 70^\circ$
Education	1950	$\frac{1950}{10800} \times 360^\circ = 65^\circ$
Savings	2400	$\frac{2400}{10800} \times 360^\circ = 80^\circ$
Misc	1200	$\frac{1200}{10800} \times 360^\circ = 40^\circ$



26. Let the measures of two adjacent angles, $\angle A$ and $\angle B$, of parallelogram ABCD are in the ratio of 3:2.

$$\text{Let } \angle A = 3x \text{ and } \angle B = 2x$$

We know that the sum of the measures of adjacent angles is 180° for a parallelogram.

$$\angle A + \angle B = 180^\circ$$

$$3x + 2x = 180^\circ$$

$$5x = 180^\circ$$

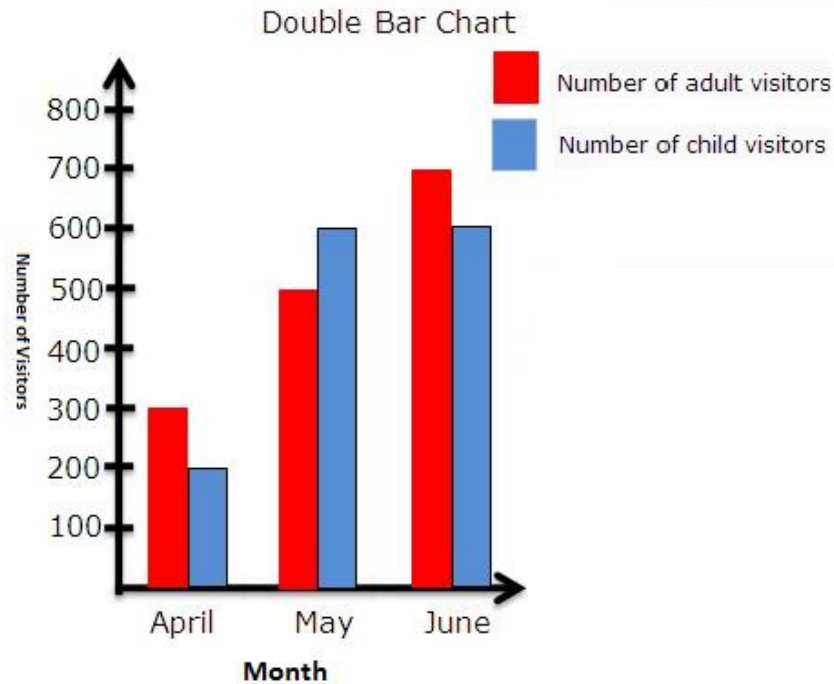
$$x = \frac{180}{5} = 36^\circ$$

$$\angle A = \angle C = 3x = 108^\circ \text{ (Opposite angles)}$$

$$\angle B = \angle D = 2x = 72^\circ \text{ (Opposite angles)}$$

Thus, the measures of the angles of the parallelogram are 108° , 72° , 108° and 72° .

27. Represent the months on the x-axis and the number of visitors on the y-axis.
The double bar graph is as follows:



28. We find the prime factors of 2048.

2	2048
2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

$$\therefore 2048 = \underline{2} \times \underline{2} \times \underline{2} \times \underline{2} \times \underline{2} \times \underline{2} \times \underline{2} \times \underline{2} \times \underline{2} \times \underline{2} \times \underline{2}$$

We find in the above prime factorisation, the number 2 does not make a pair, So 2048 is not perfect square.

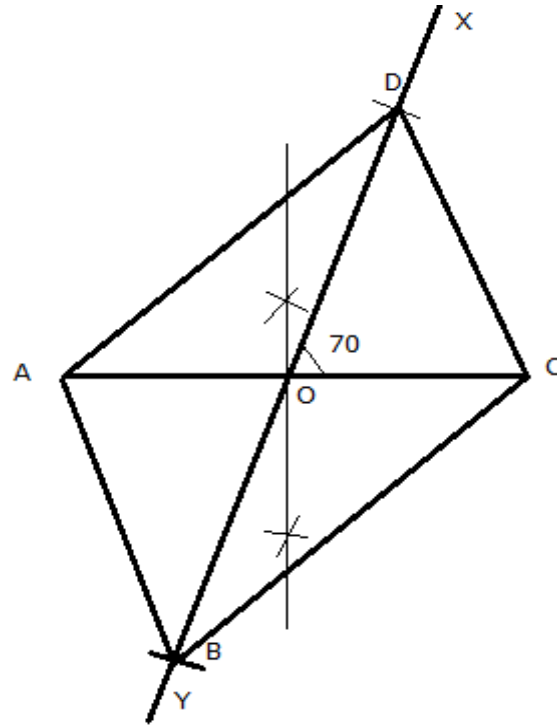
If 2 gets a pair, then the number will becomes a perfect square. Thus, by multiplying the number by 2, we get a perfect square.

$2048 \times 2 = 4096$ is a perfect square.

Hence, the required number which is to be multiplied with 2048 to get a perfect square is 2.

29. Steps of Construction:

- (i) Draw $AC = 5.4$ cm.
- (ii) Bisect AC at O .
- (iii) Make $\angle COX = 70^\circ$ and produce XO to Y .
- (iv) Set off $OB = \frac{1}{2}(6.2) = 3.1$ cm and $OD = \frac{1}{2}(6.2) = 3.1$ cm.
- (v) Join AB, BC, CD and DA . Then, $ABCD$ is the required parallelogram.



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

From the given information,

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

$$\text{Biggest side} = 3x + 15$$

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

$$\text{Third side} = 2x + 6$$

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

$$\text{Perimeter} = x + (3x + 15) + (2x + 6) = 39$$

$$6x + 21 = 39$$

$$6x = 39 - 21$$

$$6x = 18$$

$$x = 3$$

$$\text{Smallest side} = 3 \text{ cm}$$

$$\text{Biggest side} = 3x + 15 = (3 \times 3) + 15 = 24 \text{ cm}$$

$$\text{Third side} = 2x + 6 = (2 \times 3) + 6 = 12 \text{ cm}$$

31. When sales tax is charged at 10%, for a basic price of Rs.100, the price including sales tax becomes Rs. 100 + Rs. 10 = Rs. 110

Thus for Rs. 110 price + sales tax, the basic price is Rs. 100.

Therefore, for Rs. 35640 price + sales tax, the basic price is

$$= \text{Rs. } 35640 \times \frac{100}{110} = \text{Rs. } 32400$$

For Rs. 100 basic price, the price plus 7% sales tax is Rs. 107.

Therefore, for Rs. 32400 basic price, the price plus 7% sales tax is

$$= \text{Rs. } 32400 \times \frac{107}{100} = \text{Rs. } 34668$$

Extra profit made = Original list price - price with 7% sales tax

$$= \text{Rs. } (35640 - 34668) = \text{Rs. } 972$$

32. Area of field = Area of triangle ABH + Area of triangle HBC + Area of triangle CDI + Area of trapezium DEGI + Area of triangle EAG

Now,

$$\begin{aligned} \text{Area of triangle ABH} &= \frac{1}{2} \times \text{HB} \times \text{HA} \\ &= \frac{1}{2} \times 40 \times (20 + 80) \\ &= \frac{1}{2} \times 40 \times 100 \\ &= 2000 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of triangle HBC} &= \frac{1}{2} \times \text{HB} \times \text{HC} \\ &= \frac{1}{2} \times 40 \times (60 + 80) \\ &= \frac{1}{2} \times 40 \times 140 \\ &= 2800 \text{ m}^2 \end{aligned}$$

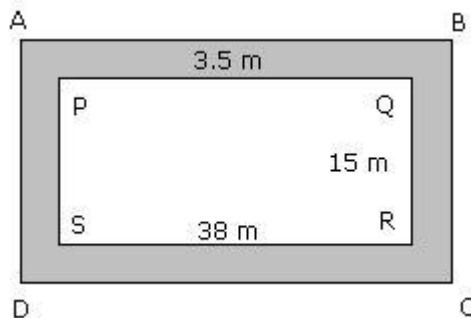
$$\begin{aligned} \text{Area of triangle CDI} &= \frac{1}{2} \times \text{DI} \times \text{CI} \\ &= \frac{1}{2} \times 60 \times 80 \\ &= 2400 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of trapezium DEGI} &= \frac{1}{2} \times GI \times (DI + EG) \\ &= \frac{1}{2} \times (60 + 20) \times (60 + 50) \\ &= \frac{1}{2} \times 80 \times 110 \\ &= 4400 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of triangle EAG} &= \frac{1}{2} \times EG \times AG \\ &= \frac{1}{2} \times 50 \times 80 \\ &= 2000 \text{ m}^2 \end{aligned}$$

$$\text{Area of field} = 2000 + 2800 + 2400 + 4400 + 2000 = 13,600 \text{ m}^2.$$

33. 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:

$$\text{Length AB} = (38 + 3.5 + 3.5) \text{ m} = 45 \text{ m}$$

$$\text{Breadth BC} = (15 + 3.5 + 3.5) \text{ m} = 22 \text{ m}$$

$$\text{So, perimeter of the path} = 2 \times (l + b) = 2 \times (45 + 22) = 2 \times 67 = 134 \text{ m}$$

Thus, perimeter of the path is 134 m.

34. The ratio of lemon-lime soda to pineapple juice:

In Arashi's punch recipe - 9:6

In Rheanna's recipe - 8:9

We want to figure out which ratio is higher: $\frac{9}{6}$ or $\frac{8}{9}$

We can compare the ratios more easily by expressing them in percentage.

First write the ratio as a decimal and then convert it to a percentage.

Thus,

$$\frac{9}{6} = 1.5 = 150\%$$

$$\frac{8}{9} = 0.8888 = 88.88\%$$

Comparing, we get

$$150\% > 88.889\%$$

Hence, Rheanna's recipe has a lower ratio of lemon-lime soda to pineapple juice.