

Goa Board
Class VIII Mathematics
Sample Paper – 2 Solution

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

Section A

1. Correct option: B

$$\sqrt[3]{1000} = \sqrt[3]{5 \times 2 \times 5 \times 2 \times 5 \times 2} = \sqrt[3]{5^3 \times 2^3} = 5 \times 2 = 10$$

2. Correct option: B

For a hexagonal prism, $V = 12$, $E = 18$

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

$$F = 2 + E - V$$

$$F = 2 + 18 - 12$$

$$F = 8$$

3. Correct option: C

$$\sqrt{484} = \sqrt{2 \times 2 \times 11 \times 11} = \sqrt{2^2 \times 11^2} = 2 \times 11 = 22$$

4. Correct option: D

$$\text{Area of square} = 49 \text{ cm}^2 = 7^2 \text{ cm}^2$$

Therefore, side of square is = 7 cm

$$\text{So the perimeter of square} = 7 \times 4 = 28 \text{ cm}$$

5. Correct option: C

$$\frac{480}{x} = \frac{15}{5}$$

$$\Rightarrow x = \frac{480 \times 5}{15} = 160$$

160 words

6. Correct option: A

$$\frac{6k+17}{k} = \frac{29}{2}$$

$$\Rightarrow 12k + 34 = 29k$$

$$\Rightarrow 17k = 34$$

$$\Rightarrow k = 2$$

7. Correct option: D

$$\frac{19z-7}{13z-5} = 1$$

$$19z-7 = 13z-5$$

$$19z-13z = -5+7$$

$$2z = 2$$

$$z = \frac{2}{2}$$

$$z = 1$$

8. Correct option: D

Each of the three expressions are with minimum power of x is 2; power of y is 2 and no power of z, so the greatest common factor of the three expressions is x^2y^2 .

Section B

9. A number is divisible by 4 if the number formed by its last two digits is divisible by 4.

(i) Consider 45748

Number formed by last two digits is 48.

48 is divisible by 4.

Hence, 45748 is also divisible by 4.

(ii) Consider 21404

Number formed by last two digits is 04.

Now, 04 is divisible by 4.

Hence, 21404 is also divisible by 4.

10. Since ABCD is an isosceles trapezoidal, we have $AD = BC$.

Therefore, $AD = BC = 4$ cm.

Now the perimeter of given trapezium = $AB + BC + CD + DA$

$$= 12 + 4 + 8 + 4 = 28$$

Hence, the perimeter of the given trapezium is 28 cm.

11. From the graph, it is clear that 5 students favoured orange and 1 student favoured green.

$$\text{Now, } 5 - 1 = 4$$

Therefore, 4 more students favoured orange colour than green.

12. Let x be the greater part.

Then, $64 - x$ is the smaller part.

Now, according to condition given,

$$3x = 5(64 - x)$$

$$3x = 320 - 5x$$

$$3x + 5x = 320$$

$$8x = 320$$

$$x = 40$$

Hence, the two parts are 40 and 24.

13. Let x be the ten's digit of the two-digit number.

Then its unit's digit = $x + 7$.

Number = unit's digit + 10(ten's digit) = $(x + 7) + 10(x) = 11x + 7$.

Sum of the digits = $(x + 7) + (x) = 2x + 7$.

Given, sum of the digits is half of the whole number.

$$\text{Therefore, } (2x + 7) = \frac{1}{2}(11x + 7)$$

$$4x + 14 = 11x + 7$$

$$4x - 11x = 7 - 14$$

$$-7x = -7$$

$$\text{i.e. } x = 1$$

Ten's digit of the two-digit number is $x = 1$.

Unit's digit of the two-digit number = $x + 7 = 1 + 7 = 8$

Thus, the required number is 18.

14. Original price of the book = Rs. 50

Increased % = 6%

Thus, New Price = Original Price + 6% of Original price

$$\text{New price} = \text{Rs. } 50 + \frac{6}{100} \times 50 = \text{Rs.}(50 + 3) = \text{Rs.}53$$

Section C

15. Let B's income be Rs. 100.

Then, A's income = Rs. 160

If A's income is Rs. 160, then B's income = Rs. 100.

If A's income is Rs 100, then B's income = Rs. $\left(\frac{100}{160} \times 100\right) = \text{Rs.}62.50$

Therefore, B's income is less than A's income by $(100 - 62.50)\%$

i.e. by 37.5%.

16. Converting 5.832 into fraction, we get $\frac{5832}{1000}$

2	5832
2	2916
2	1458
3	729
3	243
3	81
3	27
3	9
3	3
	1

Now,

$$\begin{aligned}
 & \frac{\sqrt[3]{5832}}{\sqrt[3]{1000}} \\
 &= \frac{\sqrt[3]{5832}}{\sqrt[3]{1000}} \\
 &= \frac{\sqrt[3]{2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3}}{\sqrt[3]{2 \times 2 \times 2 \times 5 \times 5 \times 5}} \\
 &= \frac{2 \times 3 \times 3}{2 \times 5} \\
 &= \frac{18}{10} \\
 &= 1.8
 \end{aligned}$$

17. Coins are cylindrical in shape.

Height (h_1) of cylindrical coins = 2 mm = 0.2 cm

Radius (r) of circular end of coins = $\frac{1.75}{2} = 0.875\text{cm}$

Let n coins were melted to form the required cuboids.

Volume of n coins = Volume of cuboids

$$\Rightarrow n \times \pi \times r^2 \times h_1 = l \times b \times h$$

$$\Rightarrow n \times \pi \times (0.875)^2 \times 0.2 = 5.5 \times 10 \times 3.5$$

$$\Rightarrow n = \frac{5.5 \times 10 \times 3.5 \times 7}{(0.875)^2 \times 0.2 \times 22}$$

$$\Rightarrow n = 400$$

Hence, number of coins melted to form such cuboids is 400.

18. Let each of the two equal angles be x° .

$$x + x + 75^\circ + 75^\circ = 360^\circ \text{ (sum of interior angles of a quadrilateral)}$$

$$2x + 150^\circ = 360^\circ$$

$$2x = 360^\circ - 150^\circ$$

$$x = \frac{210^\circ}{2} = 105^\circ$$

19. We have,

$$x = -\frac{4}{9} \text{ and } y = \frac{5}{11}$$

$$x - y = -\frac{4}{9} - \frac{5}{11} = \frac{-44 - 55}{99} = \frac{-88}{99}$$

$$\text{and } |x - y| = \left| \frac{-88}{99} \right| = \frac{88}{99}$$

$$\text{Now, } |x| - |y| = \left| \frac{-4}{9} \right| - \left| \frac{5}{11} \right| = \frac{4}{9} - \frac{5}{11} = \frac{-1}{99}$$

$$|x - y| \neq |x| - |y|$$

Now, we have to find two rational numbers between $\frac{88}{99}$ and $\frac{-1}{99}$.

Since, the denominators of the two rational numbers are same.

Required rational number are $\frac{88}{99}, \frac{87}{99}$.

$$\text{i.e. } \frac{-1}{99} < \frac{87}{99} < \frac{88}{99} < \frac{89}{99}$$

20. Let the number of matinee tickets = x

Number of tickets for evening show = 30 + 2x

Total number of tickets = x + (30 + 2x)

Given that the total number of tickets = 1200

$$x + (30 + 2x) = 1200$$

$$3x + 30 = 1200$$

$$3x = 1200 - 30$$

$$3x = 1170$$

$$x = 390$$

So number of tickets for the matinee show = 390

$$\text{Number of tickets for the evening show} = 30 + (2 \times 390) = 30 + 780 = 810$$

$$\text{Money incurred from the evening show} = 810 \times 70 = \text{Rs. } 56700$$

$$21. (5 - x)(6 - 5x)(2 - x)$$

$$= (5 - x)[6(2 - x) - 5x(2 - x)]$$

$$= (5 - x)(12 - 6x - 10x + 5x^2)$$

$$= (5 - x)(12 - 16x + 5x^2)$$

$$= 5(12 - 16x + 5x^2) - x(12 - 16x + 5x^2)$$

$$= 60 - 80x + 25x^2 - 12x - 16x^2 - 5x^3$$

$$= 60 - 92x + 41x^2 - 5x^3$$

22. Let the total number of students in the class be x .

$$\text{Percentage of girls} = 60\%$$

$$\text{Percentage of boys} = (100 - 60)\% = 40\%$$

$$\text{Therefore, number of boys} = 40\% \text{ of } x = \frac{40}{100} \times x = \frac{2x}{5}$$

$$\frac{2x}{5} = 18$$

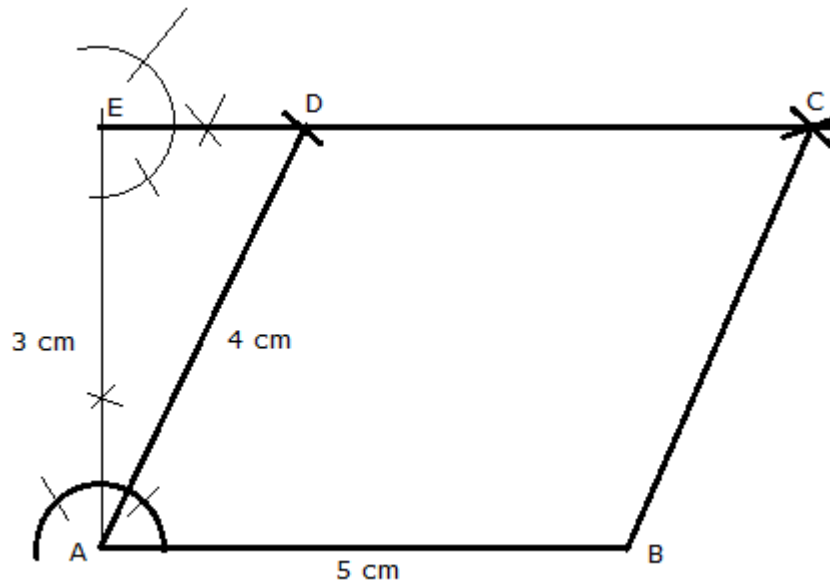
$$\Rightarrow x = \frac{18 \times 5}{2} = 45$$

Hence, the total number of students in the class is 45.

23. Steps of Construction:

1. Draw AB of length 5 cm.
2. Make an angle of 90° at A.
3. Cut AE = 3 cm.
4. Make an angle of 90° at E.
5. Cut AD = 4 cm to meet the ray of right angle at point D.
6. With B as center and radius equal to 4 cm, draw an arc.
7. With D as center and radius equal to 5 cm, draw an arc cutting the previous arc at C.
8. Join BC and DC.

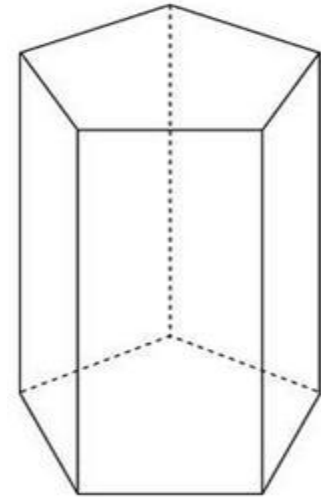
ABCD is the required parallelogram.



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 as shown below:



Here, the number of faces (F) = 7

Number of edges (E) = 15

The number of vertices (V) = 10

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

And, $E + 2 = 15 + 2 = 17$

Thus, $F + V = E + 2$

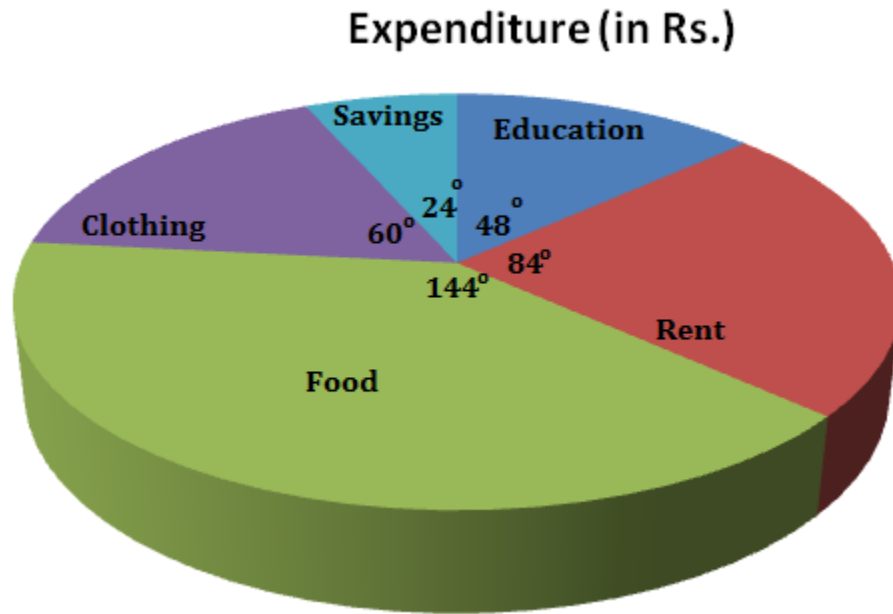
Hence, Euler's formula is verified

Section D

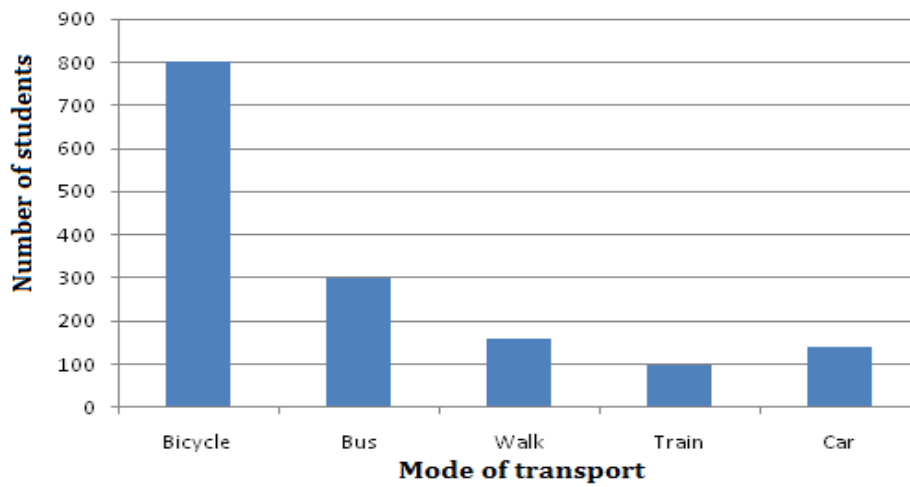
25.

Items	Expenditure (in Rs.)	Measure of the central angle
Education	2000	$\frac{2000}{15000} \times 360^\circ = 48^\circ$
Rent	3500	$\frac{3500}{15000} \times 360^\circ = 84^\circ$
Food	6000	$\frac{6000}{15000} \times 360^\circ = 144^\circ$
Clothing	2500	$\frac{2500}{15000} \times 360^\circ = 60^\circ$
Savings	1000	$\frac{1000}{15000} \times 360^\circ = 24^\circ$
Total	15000	360°

On the basis of table, the pie diagram is drawn:



26.



27. The ratio of students who preferred blue to students who preferred red:

In Mrs. Valdez's class - 14:6

In Mrs. Kim's class, 8:5

We want to figure out which ratio is higher:

$$\frac{14}{6} \text{ or } \frac{8}{5}$$

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,

$$\frac{14}{6} = 2.33333 = 233.33\%$$

$$\text{And, } \frac{8}{5} = 1.6 = 160\%$$

Comparing, we get $233.33\% > 160\%$

Hence, Mrs. Valdez's class had a higher ratio of students who preferred blue to students who preferred red.

28. 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

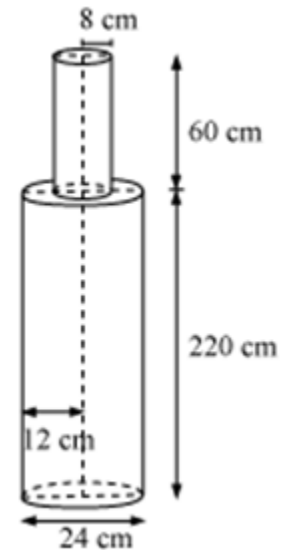
Radius (r_2) of smaller cylinder = 8 cm

Total volume of pole = Volume of larger cylinder + Volume of cylinder

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

Mass of 1 cm³ iron = 8 g

Mass of 111532.8 cm³ iron = 111532.8 × 8 = 892262.4 g = 892.262 kg



29. 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

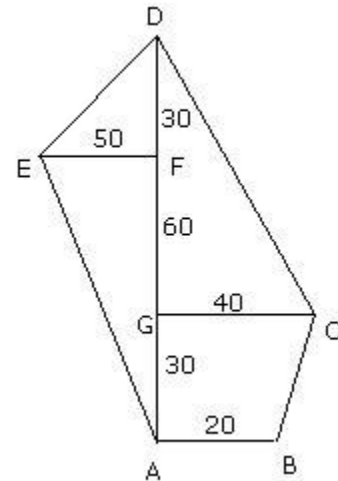
30. Area of polygon = Area of trapezium ABCG + Area of triangle GCD + Area of triangle DEF + Area of triangle EAF

Now,

$$\begin{aligned} \text{Area of trapezium ABCG} &= \frac{1}{2} \times AG \times (AB + CG) \\ &= \frac{1}{2} \times 30 \times (20 + 40) \\ &= \frac{1}{2} \times 30 \times 60 \\ &= 900 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of triangle GCD} &= \frac{1}{2} \times GC \times DG \\ &= \frac{1}{2} \times 40 \times (60 + 30) \\ &= \frac{1}{2} \times 40 \times 90 \\ &= 1800 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of triangle DEF} &= \frac{1}{2} \times EF \times DF \\ &= \frac{1}{2} \times 50 \times 30 \\ &= 750 \text{ m}^2 \end{aligned}$$



$$\begin{aligned}
 \text{Area of triangle EAF} &= \frac{1}{2} \times EF \times FA \\
 &= \frac{1}{2} \times 50 \times (60 + 30) \\
 &= \frac{1}{2} \times 50 \times 90 \\
 &= 2250 \text{ m}^2
 \end{aligned}$$

Hence area of polygon = $900 + 1800 + 750 + 2250 = 5700 \text{ m}^2$.

31. Let DB bisects AC at O, so we have:

$$AO + OC = 6 \text{ cm}$$

$$\text{Now, } AO:OC = 1:2$$

$$1x + 2x = 6$$

$$3x = 6$$

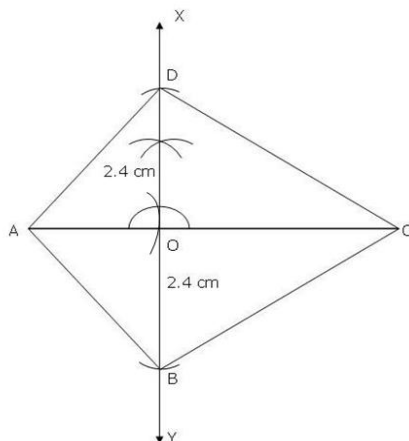
$$x = 2$$

$$AO = 2 \text{ cm and } OC = 4 \text{ cm}$$

Steps of construction:

- Draw $AC = 6 \text{ cm}$.
- With A as centre, draw an arc of radius 2 cm to get point O on AC.
- Draw a perpendicular XY at O.
- With O as centre and radius 2.4 cm draw arcs on OY and OX to get points B and D.
- Join AB, AD, CD and CB.

ABCD is the required kite.



32. Suppose the price of the jeans is Rs. 100.

30% reduction on Rs. 100.

$$d = 0.30 \times 100 = 30$$

To get the first reduction price, subtract 30 from 100.

$$100 - 30 = 70$$

Now, take the 10% discount on Rs. 70.

$$0.10 \times 70 = 7$$

Subtract 7 from 70.

$$70 - 7 = 63$$

So, the final price after both the reductions is Rs. 63.

To get the amount of change, subtract the old amount from the new amount.

$$63 - 100 = -37$$

Divide by the original amount.

$$\frac{-37}{100} = -37\%$$

So, the percent of decrease is 37%.

The reductions are different. If the jeans are first marked down 30%, and then reduced another 10%: this is only a 37% reduction, not a 40% reduction.

33.

I. A rational number between $\frac{1}{2}$ and $\frac{1}{3}$.

$$\frac{1}{2}\left(\frac{1}{2} + \frac{1}{3}\right) = \frac{1}{2}\left[\frac{3+2}{6}\right] = \frac{1}{2}\left(\frac{5}{6}\right) = \frac{5}{12}$$

$$\text{i.e. } \frac{1}{2} > \frac{5}{12} > \frac{1}{3}$$

II. Now a rational number between $\frac{1}{2}$ and $\frac{5}{12}$

$$\frac{1}{2}\left(\frac{1}{2} + \frac{5}{12}\right) = \frac{1}{2}\left[\frac{6+5}{12}\right] = \frac{1}{2}\left(\frac{11}{12}\right) = \frac{11}{24}$$

$$\text{i.e. } \frac{1}{2} > \frac{11}{24} > \frac{5}{12} > \frac{1}{3}$$

III. A rational number between $\frac{5}{12}$ and $\frac{1}{3}$

$$\frac{1}{2}\left(\frac{5}{12} + \frac{1}{3}\right)$$

$$= \frac{1}{2}\left[\frac{5+4}{12}\right]$$

$$= \frac{1}{2}\left(\frac{9}{12}\right)$$

$$= \frac{1}{2}\left(\frac{3}{4}\right)$$

$$= \frac{3}{8}$$

$$\text{i.e. } \frac{1}{2} > \frac{11}{24} > \frac{5}{12} > \frac{3}{8} > \frac{17}{48} > \frac{1}{3}$$

IV. A rational number between $\frac{3}{8}$ and $\frac{1}{3}$

$$\text{i.e. } \frac{1}{2} > \frac{11}{24} > \frac{5}{12} > \frac{3}{8} > \frac{17}{48} > \frac{1}{3}$$

Hence four rational numbers between $\frac{1}{2}$ and $\frac{1}{3}$ are $\frac{11}{24}$, $\frac{5}{12}$, $\frac{3}{8}$ and $\frac{17}{48}$.

34.

$$(i) \quad x^0 \times y^0 \times z^0 = 1 \times 1 \times 1 = 1$$

$$(ii) \quad \frac{(x^0 + y^0) \times 2^5}{2^4} = (1 + 1) \times 2^{5-4} = 2 \times 2^1 = 4$$

$$(iii) \quad (4^6)^7 = 4^{6 \times 7} = 4^{42} = (2^2)^{42} = 2^{84}$$

$$\frac{a^2 \times a^3 \times b^3 \times b^4}{a^5 \times b^2}$$

$$= \frac{a^{2+3} b^{3+4}}{a^5 \times b^2}$$

$$= \frac{a^5 b^7}{a^5 \times b^2}$$

$$(iv) = a^{5-5} \times b^{7-2}$$

$$= a^0 \times b^5$$

$$= 1 \times b^5$$

$$= b^5$$