Goa Board
Class VIII Mathematics
Sample Paper – 4 Solution

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

Section A

1. Correct answer: A
   Edge

2. Correct answer: C
   2.5 is greater than 2.4 and less than 2.6 and 2.7.
   Hence, on a number line, 2.5 will lie between 2.4 and 2.7.

3. Correct answer: D
   A rational number is a number of the form $\frac{p}{q}$ where q≠ 0. So, in case of reciprocal of 0, denominator will be 0.

4. Correct answer: D
   Sales tax = $\frac{4}{100}\times 380 = 15.20$

5. Correct answer: C
   A circle is not a polygon. A polygon is a closed curve made up of only line segment.

6. Correct answer: A
   $0.84 \times 0.76 = (0.80 + 0.04)(0.80 - 0.04)$
   $=(0.80)^2 \times (0.04)^2$
   $= [(x - y)(x + y) = x^2 - y^2]$

7. Correct answer: D
   $A = \frac{1}{2}\times \text{base} \times \text{height}$
   $= \frac{1}{2}\times (4x)(x + 1) \times (x - 3)$
   $= 2x(x^2 - 2x - 3)$
   $= 2x^3 - 4x^2 - 6x$

8. Correct answer: C

$$\frac{4}{x-1} = \frac{3}{x+7}$$

On cross-multiplying, we get

4x + 28 = 3x - 3

4x - 3x = -3 - 28

x = -31

x + 31 = 0

Section B

9.

i) 45

45 = 40 + 5

= 4 × 10 + 5 × 1

ii) 123

123 = 100 + 20 + 3

= 1 × 100 + 2 × 10 + 3 × 1

10. I) Let x be the multiplicative inverse of $\frac{-5}{8} \times \frac{-3}{7}$

$$\frac{-5}{8} \times \frac{-3}{7} \times (x) = 1$$

$$\Rightarrow \frac{15}{56} \times (x) = 1$$

$$\Rightarrow (x) = \frac{56}{15}$$

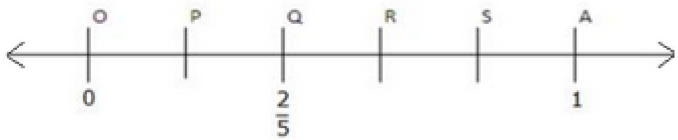
II) Let x be the multiplicative inverse of $-1 \times \frac{-2}{5}$

Or, x = $\frac{5}{2}$

11. The number $\frac{2}{5}$ lies between 0 and 1.

Draw a number line. Mark points O and A to represent 0 and 1, respectively.

Divide OA into 5 equal parts (equal to the denominator of $\frac{2}{5}$).The second point, Q, represents the rational number $\frac{2}{5}$.



12. (i) $1.002 \times 10^6 = 1.002 \times 1000000 = 1002000$

(ii) $5.54 \times 10^7 = 5.54 \times 10000000 = 55400000$

13. Steps of construction:

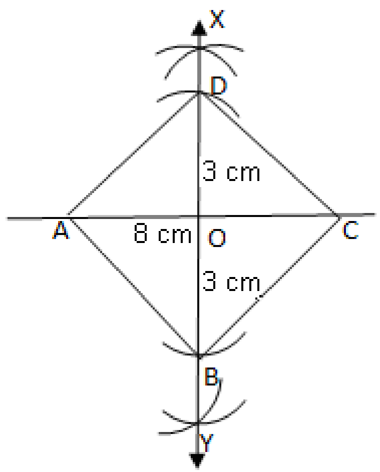
a) Draw AC = 8 cm.

b) Draw perpendicular bisector XY of AC meeting AC at O.

c) From O cut off OD = $\frac{1}{2} \times 6$ cm = 3 cm along OX and OB = $\frac{1}{2} \times 6$ cm =3 cm along OY.

d) Join AB, BC, CD and DA.

ABCD is the required rhombus.



14. Let the required number be x. Then,

26% of x = 65

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

Hence, the required number is 250.

Section C

15. Cost Price(CP) = $\left(\frac{100}{100 + gain\%}\right) \times \text{Selling Price}(SP)$

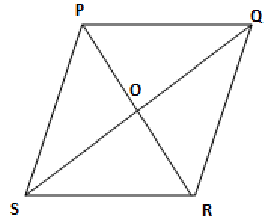
Thus, CP of 1st transistor = $\left(\frac{100}{120} \times Rs.840\right) = Rs.700$

CP of 2nd transistor $\left(\frac{100}{96} \times Rs.960\right) = Rs.1000$

So, total C.P. = Rs. (700 + 1000) = Rs. 1700
Total S.P. = Rs. (840 + 960) = Rs. 1800
Gain = Rs. (1800 – 1700) = Rs. 100

$$\therefore Gain\% = \left(\frac{100}{1700} \times 100\right)\% = 5\frac{15}{17}\%$$

16. Let PQRS be the rhombus as shown in the figure:



Now, let diagonal QS of rhombus PQRS be equal to one of its side RS.

Hence, PQ = QR = RS = SP = QS ... (since all sides of rhombus are equal)

⇒ SRQ and SPQ are equilateral triangles.

⇒ ∠R = ∠P = 60°

Now,

⇒ ∠S + ∠R = 180°

$\Rightarrow \angle S + 60° = 180°$

$\Rightarrow \angle S = 120°$

Hence, $\angle R = \angle P = 60°$ and $\angle S = \angle Q = 120°$

17. The length of the fence required is the perimeter of the rectangular garden.
Given that
Length (l) = 25 m; Breadth (b) = 18 m
i.e. Perimeter = 2 × (l + b)
= 2 × (25 + 18)
= 2 × 43
= 86 m
So, the perimeter of the garden or the length of the fence required is 86 m.
Cost of fencing 1 m = Rs. 200
Thus, Cost of fencing 86 m = Rs. 200 × 86 = Rs. 17,200

18. Here, at unit's place A × 5 = A

That is we need to search for a number, which when multiplied to 5 gives the same unit place.

Such a number is 5 or 0, as 5 × 5 = 25 or 0 × 5 = 0

Case (1) Taking 5 in place of A, we get

```
2
B  A
×  5
C B 5
```

Here, B can take the value 2, which satisfy the condition, taking, B = 2, we get

```
2
2  5
×  5
1 2 5
```

Thus, A = 5, B = 2 and C = 1

Case (2) Taking 0 in place of A, we get

$$\begin{array}{r} B\ 0 \\ \times\ \ 5 \\ \hline C\ B\ 0 \\ \hline \end{array}$$

Here B can take the value 5, which satisfy the condition, taking B = 5,

we get

$$\begin{array}{r} 5\ 0 \\ \times\ \ 5 \\ \hline 2\ 5\ 0 \\ \hline \end{array}$$

Thus, A = 0, B = 5 and C =2.

19.

$$4x^2+\frac{1}{9x^2}-\frac{4}{3}$$
$$=(2x)^2+\frac{1}{(3x)^2}-\frac{4}{3}$$
$$=(2x)^2+\frac{1}{(3x)^2}-2x(2x)\left(\frac{1}{3x}\right)$$

Taking a =2x and b $=\frac{1}{3x}$ in the identity:

$a^2-2ab+b^2=(a-b)^2$, we get

$$=\left(2-\frac{1}{3x}\right)^2$$
$$=\left(2-\frac{1}{3x}\right)\left(2-\frac{1}{3x}\right)$$

Hence,

$$4x^2+\frac{1}{9x^2}-\frac{4}{3}=\left(2-\frac{1}{3x}\right)\left(2-\frac{1}{3x}\right)$$

20. We know that the sum of the interior angles of a polygon of n sides is equal to (2n - 4) right angles.

Therefore, sum of all interior angles of a pentagon is 540°.

x + 100° + x + 90° + 90° = 540°

2x = 540° – 280°

$x = \frac{260°}{2} = 130°$

21. Using Long Division, we have

$$\begin{array}{r|l} & 2z+5 \\ 2z^2 - z + 1 & 4z^3 + 8z^2 + 8z + 7 \\ & _{(-)}4z^3 - 2z^2 + 2z \\ \hline & 10z^2 + 6Z + 7 \\ & _{(-)}10z^2 - 5z + 5 \\ \hline & 11z + 2 \end{array}$$

From above, we see that the degree of remainder is less than the degree of the divisor and hence, division process stops at this step.

Thus, we have

Quotient: 2z + 5 and Remainder: 11z + 2

Verification: Divisor × Quotient + Remainder=$2z^2 - z + 1 \times (2z + 5) + (11z + 2)$

$2z^2 - z + 1 \times (2z + 5) + (11z + 2)$

$= (4z^3 + 10z^2 - 2z^2 - 5z + 2z + 5) + (11z + 2)$

$= 4z^3 + 8z^2 - 3z + 5 + 11z + 2$

$= 4z^3 + 8z^2 + 8z + 7$= Dividend

Hence, verified.

22. (i) $(3q)^5 = 3q \times 3q \times 3q \times 3q \times 3q$

(ii) $3q^5 = 3 \times q \times q \times q \times q \times q$

(iii) $3^5q = 3 \times 3 \times 3 \times 3 \times 3 \times q$

23. Consider

$27xy^2(17x^2 - 68) = 27xy^2 \times 17(x^2 - 4)$

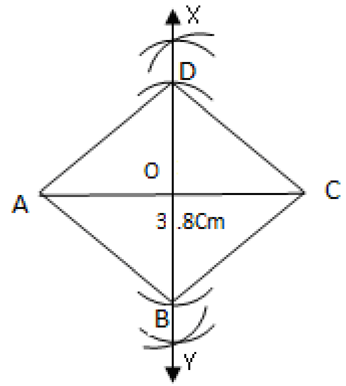
$= 17 \times 27xy^2 (x^2 - 2^2)$

$= 17 \times 27xy^2 (x - 2)(x + 2)$

Thus,

$$\frac{27xy^2(17x^2-68)}{51\times(x+2)} = \frac{17 \times 27xy^2 (x-2)(x+2)}{51\times(x+2)} = 9y^2(x-2)$$

24. Diagonals of a square are perpendicular bisector of each other. Also, they are equal.



Steps of Construction:

a) Draw AC =3.8 cm.

b) Draw perpendicular bisector XY of AC meeting AC at O.

c) From O, draw an arc of radius 1.9 cm on both side of AC intersecting OX at D and OY at B.

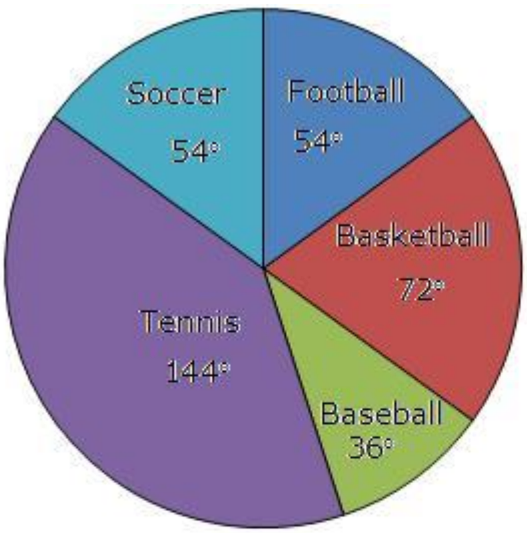
d) Join AD, DC, CB and BA.

ABCD is the required square.

Section D

25.

Sport	%	Angle
Football	15	$\frac{15}{100} \times 360° = 54°$
Basketball	20	$\frac{20}{100} \times 360° = 72°$
Baseball	10	$\frac{10}{100} \times 360° = 36°$
Tennis	40	$\frac{40}{100} \times 360° = 144°$
Soccer	15	$\frac{15}{100} \times 360° = 54°$



26. To construct the rectangle we go through the following steps:

i) Draw AB = 4 cm.

ii) At B, draw ∠ABK = 90°.

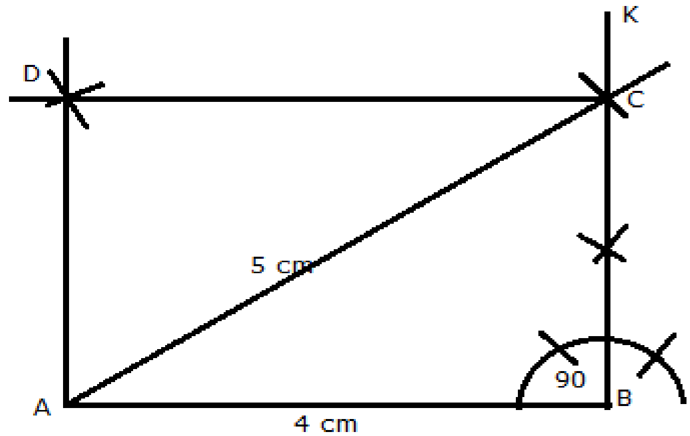
iii) With A as centre and radius 5 cm, draw an arc cutting BK at C.

iv) With C as the centre and radius 4 cm, draw an arc.

v) With A as centre and radius = BC, draw an arc cutting the arc drawn in Step 4 at D.

vi) Join DC and AD.

ABCD is the required rectangle.



27.

I) Mathematics
II) Average = 66
III) Hindi
IV) The bar graph shows marks obtained by a student in 5 subjects.

28. 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, $\frac{9}{6} = 1.5 = 150\%$

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

Comparing, we get

$150\% > 88.889\%$

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

29. Steps of construction:

a) Draw KL = 5.2 cm.

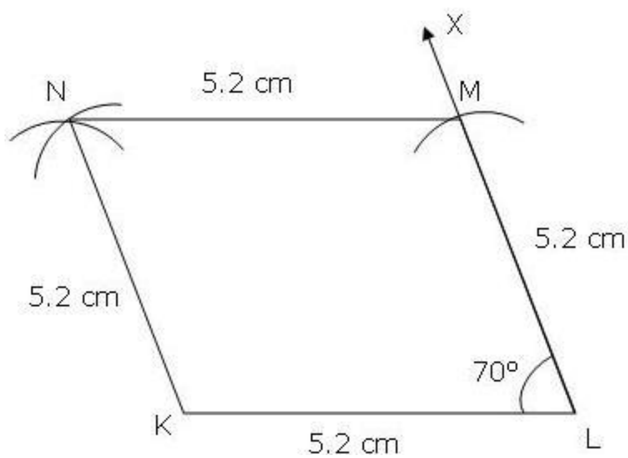
b) Draw $\angle XLK = 70°$.

c) Cut an arc of radius 5.2 cm on LX from point L to get point M.

d) From M and K, draw arcs of radius 5.2 cm each intersecting each other at point N.

e) Join NK and NM.

KLMN is the required rhombus.



30.

$$i)\frac{5^3\times3^5\times6}{3^2\times25}$$
$$=\frac{5^3\times3^5\times3\times2}{3^2\times5^2}$$
$$=5^{3-2}\times3^{5+1-2}\times2$$
$$=5^1\times3^4\times2$$
$$=5\times81\times2$$
$$=810$$

$$ii)\frac{2^8\times3^4}{8\times2^5\times27}$$
$$=\frac{2^8\times3^4}{8\times2^5\times3^3}$$
$$=2^{8-3-5}\times3^{4-3}$$
$$=2^0\times3^1$$
$$=1\times3$$
$$=3$$

$$iii)\frac{a^2\times a^3\times b^3\times b^4}{a^5\times b^2}$$
$$=\frac{a^{2+3}\times b^{3+4}}{a^5\times b^2}$$
$$=\frac{a^5\times b^7}{a^5\times b^2}$$
$$=a^{5-5}\times b^{7-2}$$
$$=a^0\times b^5$$
$$=1\times b^5$$
$$=b^5$$

(iii) $\dfrac{a^2 \times a^3 \times b^3 \times b^4}{a^5 \times b^2}$

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

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

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

$= a^0 \times b^5$

$= 1 \times b^5$

$= b^5$

(iv) $\left(\dfrac{a^3}{b^4}\right)^2 \times \left(\dfrac{b^2}{a^3}\right)^3$

$= \dfrac{\left(a^3\right)^2}{\left(b^4\right)^2} \times \dfrac{\left(b^2\right)^3}{\left(a^3\right)^3}$

$= \dfrac{a^6}{b^8} \times \dfrac{b^6}{a^9}$

$= \dfrac{a^6}{a^9} \times \dfrac{b^6}{b^8}$

$= a^{6-9} \times b^{6-8}$

$= a^{-3} \times b^{-2}$

31.

i. $\dfrac{x+0.25}{3} - x = 0.5$

LCM of 3 and 1 = 3

$\dfrac{x+0.25-3z}{3} = 0.5$

Multiplying both sides with 3, we get

0.25 - 2x = 0.5 × 3

0.25 - 2x = 1.5

Transposing 0.25 to the right hand side

$\Rightarrow$ -2x = 1.5 - 0.25

$\Rightarrow$ -2x = 1.25

$\Rightarrow$ x = - $\dfrac{1.25}{2}$

ii. Transposing $\frac{(3x-1)}{9}$ and -2,

$\frac{(5x+1)}{12}-\frac{(3x-1)}{9}=2$

L.C.M of 12 and 9 = 36

$\frac{3(5x+1)-4(3x-1)}{36}=2$

Multiplying both sides with 36, we get:

15x + 3 – 12x + 4 = 72

3x = 72 – 7 = 65

x = $\frac{65}{3}$ = 21.67

32. ABCD has two parts.

In $\triangle$DAB,

Area of $\triangle$DAB=$\frac{1}{2}\times$base$\times$height =$\frac{1}{2}\times 13\times 5$ = 32.5 cm^2

Area of $\triangle$CBD, CB = 9 cm, CD = 15 cm.

Use Pythagorean triplets to determine area of $\triangle$CBD.

$15^2-9^2=144=\sqrt{144}=12$

BD=12 cm

Area of $\triangle$CBD=$\frac{1}{2}\times$base$\times$height =$\frac{1}{2}\times 12\times 9$=54 cm^2

Area of ABCD = Area of $\triangle$CBD + Area of $\triangle$CBD = 32.5 + 54 = 86.5 cm^2.

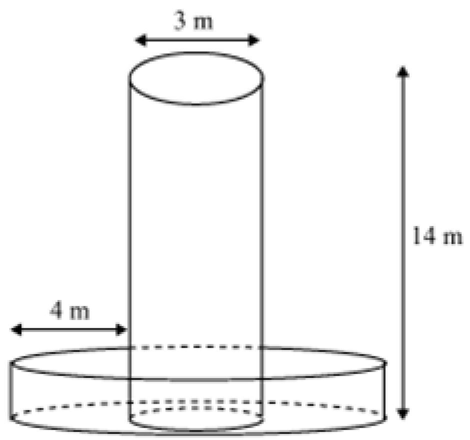
33. The shape of well will be cylindrical.

Depth (h_1) of well = 14 m

Radius (r_1) of circular end of well = $\frac{3}{2}m$

Width of embankment = 4 m

From the figure embankment will be in a cylindrical shape having outer radius (r_2) as $4+\frac{3}{2}=\frac{11}{2}$ and inner radius (r_1) as $\frac{3}{2}m$.



Let height of embankment be h_2.

Volume of soil dug from well = volume of earth used to form embankment

$$\Rightarrow \pi\times r_1^2\times h_1=\pi\times(r_2^2-r_1^2)\times h_2$$

$$\Rightarrow \pi\times\left(\frac{3}{2}\right)^2\times 14=\pi\times\left[\left(\frac{11}{2}\right)^2-\left(\frac{3}{2}\right)^2\right]\times h$$

$$\Rightarrow \frac{9}{4}\times 14=\frac{112}{4}\times h$$

$$\Rightarrow h=\frac{9}{8}=1.125m$$

So, height of embankment will be 1.125 m.

34. The percent of discount can be defined as

$$\text{Percent of Discount}=\frac{\text{Discount}}{\text{Original Selling Price}} \qquad ...(1)$$

For shop A, the original selling price is Rs. 32.25 and the percent of discount is 20%.

So, substitute 0.20 for the percent of discount and 32.25 for the original selling price in equation (1).

$$0.20=\frac{Discount}{32.25}$$

$$Discount=6.45$$

So, the discount is Rs. 6.45.

To find the sale price, subtract the discount from the original selling price.

Selling price = 32.25 - 6.45 = 25.80

So, shop A is selling the item for Rs. 25.80.

For shop B, the original selling price is Rs. 43.35 and the percent of discount is 40%.

So, substitute 0.40 for the percent of discount and 43.35 for the original selling price in equation (1).

$$0.40 = \frac{Discount}{43.35}$$
$$Discount = 17.34$$

So, the discount is Rs. 17.34.

For shop B the sale price is

43.35 - 17.34 = 26.01

So, shop B is selling the item for Rs. 26.01.