CBSE Board
Class VIII Mathematics
Term I
Sample Paper 3

Time: 3 hours Total Marks: 80

General Instructions:

1. **All** questions are **compulsory**.
2. **Section A** comprises of **12** questions carrying 1 mark each.
3. **Section B** comprises of **12** questions carrying 2 marks each.
4. **Section C** comprises of **8** questions carrying 3 marks each.
5. **Section D** comprises of **5** questions carrying 4 marks each.

Section A
(Questions 1 to 8 carry 1 mark each)

1. The rational number whose reciprocal is not a rational number is _____.
   A. 1
   B. -1
   C. $-\frac{1}{5}$
   D. Zero

2. 20% of x stands for _____.
   A. $\frac{x}{3}$
   B. $\frac{x}{5}$
   C. $\frac{x}{6}$
   D. 0.02x

3. A pentagon has _____ vertices.
   A. 5
   B. 6
   C. 7
   D. 8

4. Find the square root of $\sqrt{\frac{196}{484}}$.

   A. $\frac{7}{11}$

   B. $\frac{8}{11}$

   C. $\frac{9}{11}$

   D. $\frac{10}{11}$

5. The probability of an event always lies between _____.

   A. 0 and 2

   B. 0 and 1

   C. 0 and $\frac{1}{2}$

   D. -1 and 1

6. Which natural number is equal to its cube?

   A. 1

   B. 2

   C. 3

   D. 4

7. The rational number whose reciprocal is not a rational number is _____.

   A. 1

   B. -1

   C. $-\frac{1}{5}$

   D. Zero

8. If $\frac{6k+17}{k} = \frac{29}{2}$, then the value of 'k' is

   A. 2

   B. 3

   C. 4

   D. 5

9. Number of edges in the following shape is

A. 8
B. 10
C. 12
D. 9

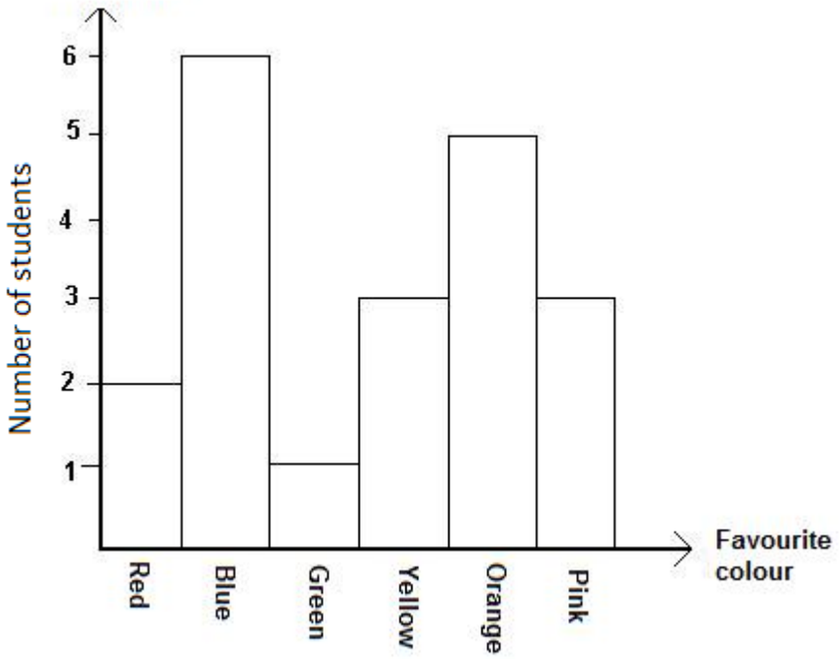
10. If SP = Rs. 380 and sales tax is 4%, then the amount of sales tax is given by:
    A. Rs 15.40
    B. Rs 15.60
    C. Rs 15.30
    D. Rs 15.20

11. Square root of 484 is given by which of the options listed below?
    A. 21
    B. 42
    C. 22
    D. 32

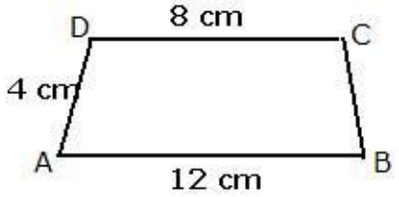
12. If 14 kg of bananas cost Rs 441, then the cost of 22 kg bananas will be which of the following options listed below:
    A. Rs. 752
    B. Rs. 693
    C. Rs. 842
    D. Rs. 947

Section B
(Questions 9 to 14 carry 2 marks each)

13. Represent $\frac{2}{5}$ on the number line.
14. Construct a rhombus ABCD, whose diagonals are of length 6 cm and 8 cm. Also, write the steps of construction.
15. A polyhedron is having 8 vertices and 12 edges. Find the number of faces in this polyhedron.
16. Find the square of the number (-25), using the identity $(a + b)^2 = a^2 + b^2 + 2ab$.
17. The given bar graph shows the favourite colours of 20 students in a class. How many more students favour orange colour than green colour?



18. The following quadrilateral is an isosceles trapezoidal. Find its perimeter.



19. The price of a book was Rs. 50. If the price is increased by 6%, then what will be the new price of the book?
20. The side of a square is (5a - 2b). Find its area.
21. Find the square of the number 82 using the property $(a + b)^2 = a^2 + b^2 + 2ab$
22. In a two-digit number, the unit's digit is 7 more than the ten's digit. Sum of the digits is half of the whole number. Find the digits and number.
23. If 26% of a number is 65, then find the number.
24. Solve the following expression using properties of rational numbers:

$$\frac{2}{5}\times\frac{-3}{7}-\frac{1}{14}-\frac{3}{7}\times\frac{3}{5}$$

Section C

(Questions 15 to 24 carry 3 marks each)

25. In the following product, find A, B and C.

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

26. Find the cubes of the following numbers:

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

ii) 0.06

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

27. Find a number such that one-fourth of it is less than one-third of it by 4
28. In a class, the girls are 60% of the total number of students and the boys are 18 in number. How many students are there in the class?

29. A survey was conducted in a school to determine which sport is liked by the students. The result of the survey is given in the table below.

Sport	% of students
Football	15
Basketball	20
Baseball	10
Tennis	40
Soccer	15

30. Construct a square whose side measures 4.7 cm. Write the steps of construction.
31. A's income is 60% more than that of B. By what percent is B's income less than A's?
32. Solve: $\frac{(5x+1)}{12}-2=\frac{(3x-1)}{9}$

Section D

(Questions 25 to 34 carry 4 marks each)

33. Construct a quadrilateral ABCD in which AB = 3.8 cm, BC = 3.4 cm, CD = 4.5 cm, AD = 4 cm and $\angle B = 80°$. Write the steps of construction.

34. The following table shows various modes of transport used by 1500 students of a school.

Mode of transport	Bicycle	Bus	Walk	Train	Car
Number of students	800	300	160	100	140

Draw the bar graph to represent the above data.

35. The regular selling price of an item at Shop A is Rs. 32.25. The shop offers a discount of 20%. The regular selling price of the same item at shop B is Rs. 43.35 and the discount

is 40%. Which shop offers the lowest sale price? Also find the difference in the sale prices.

36. A pair of jeans is marked down 30% and then is reduced at the cash register by another 10%. Is this a total reduction of 40%? Give reasons.
37. Simplify:
    i. $(-8)^2$
    ii. $(-7)^2$
    iii. $(15)^3$
    iv. $-(12^2)$

CBSE

Class VIII Mathematics

Sample Paper – 3 Solution

Time: 3 hours **Total Marks: 80**

Section A

1. 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.

2. Correct answer: B

   20% of x= $\frac{20}{100}x = \frac{x}{5}$

3. Correct answer: A

   Five vertices.

4. Correct option : A

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

5. Correct answer: B

   0 and 1

6. Correct answer: A

   $1^3 = 1$

   Thus, the natural number 1 is equal to its cube.

7. 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.

8. Correct option: A

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

   $\Rightarrow 12k + 34 = 29k$

   $\Rightarrow 17k = 34$

   $\Rightarrow k = 2$

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

10. Correct answer: D

Sales tax = $\frac{4}{100} \times 380 = 15.20$

11. Correct option: C

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

12. Correct option: B

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

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

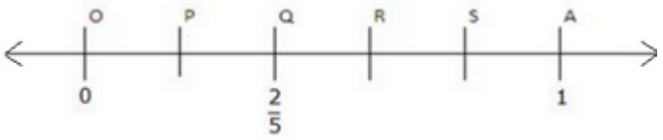
Section B

(Questions 8 to 11 carry 2 marks each)

13. 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 $\frac{2}{5}$.



14. Steps of construction:

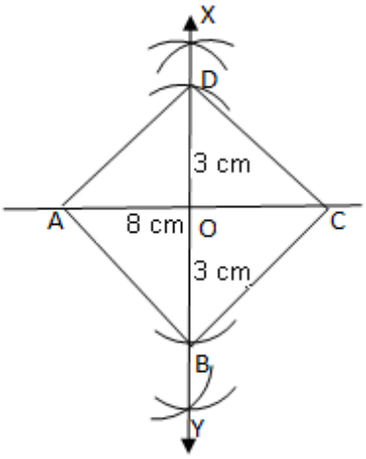
a) Draw AC = 8 cm.

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

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

d) Join AB, BC, CD and DA.

ABCD is the required rhombus.



15. 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.

16. We have:

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

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

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

$= 400 + 25 + 200 = 625$

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

18. 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.

19. Original price of the book = Rs. 50

Increased % = 6%

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

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

20. Area of square = $(5a - 2b)^2$
We use the identity $(x - y)^2 = x^2 - 2xy + y^2$
Taking, x = 5a and y = 2b
We get, $(5a - 2b)^2 = (5a)^2 - 2(5a)(2b) + (2b) = 25a^2 - 20ab + 4b^2$

21. $82^2 = (80 + 2)^2$

In the property $(a + b)^2 = a^2 + b^2 + 2ab$, putting a = 80 and b = 2, we get:

$(80 + 2)^2 = 80^2 + 2^2 + 2 \times 80 \times 2$

$= 6400 + 4 + 320$

$= 6724$

22. 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.
Therefore, $(2x+7) = \frac{1}{2}(11x+7)$
$4x + 14 = 11x + 7$
$4x - 11x = 7 - 14$
$-7x = -7$
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.

23. Let the required number be x. Then,

26% of x = 65

$$\Rightarrow \frac{26}{100}x = 65$$

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

$$\Rightarrow x = 250$$

Hence, the required number is 250.

24. $\frac{2}{5} \times \frac{-3}{7} - \frac{1}{14} - \frac{3}{7} \times \frac{3}{5} = \frac{2}{5} \times \frac{-3}{7} - \frac{3}{7} \times \frac{3}{5} - \frac{1}{14}$

(by commutativity)

$= \frac{2}{5} \times \frac{-3}{7} + (\frac{-3}{7}) \times \frac{3}{5} - \frac{1}{14}$

$= \frac{-3}{7}\left(\frac{2}{5} + \frac{3}{5}\right) - \frac{1}{14}$

(by distributivity)

$= \frac{-3}{7} \times 1 - \frac{1}{14} = \frac{-6-1}{14} = \frac{-7}{14} = \frac{-1}{2}$

Section C

25. 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

26.

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

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

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

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

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

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

27. 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.

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

Percentage of girls = 60%

Percentage of boys = (100 - 60)% = 40%

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

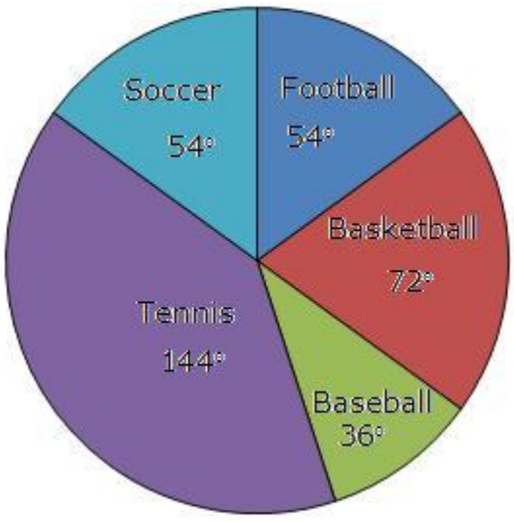
$$\frac{2x}{5}=18$$

$$\Rightarrow x=\frac{18\times5}{2}=45$$

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

29.

Sport	%	Angle
Football	15	$\frac{15}{100}\times360°=54°$
Basketball	20	$\frac{20}{100}\times360°=72°$
Baseball	10	$\frac{10}{100}\times360°=36°$
Tennis	40	$\frac{40}{100}\times360°=144°$
Soccer	15	$\frac{15}{100}\times360°=54°$



30. Steps of construction:

a) Draw AB = 4.7 cm.

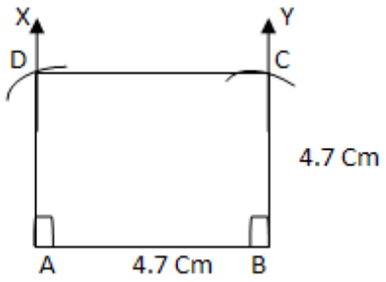
b) Draw $\angle XAB = 90°$ and $\angle YBA = 90°$.

c) With A as centre and radius 4.7 cm, draw an arc which cuts AX at D.

d) With B as centre and radius 4.7 cm, draw an arc which cuts BY at C.

e) Join DC.

ABCD is the required square.



31. 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. $\left(\frac{100}{160}\times 100\right) = Rs.62.50$

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

i.e. by 37.5%.

32. 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

Section D

33. Steps of construction:

a) Draw AB =3.8cm.

b) Draw ∠XBA =80°.

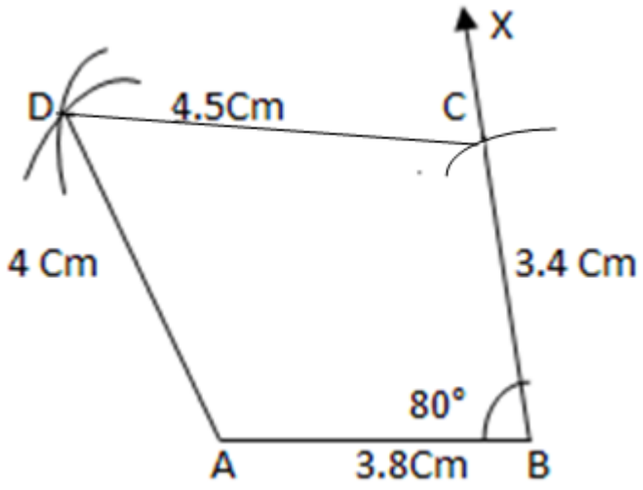
c) Taking B as centre, draw an arc of radius 3.4 cm on BX cutting BX at point C.

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.



34.

35. The percent of discount can be defined as

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

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.

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

The 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 × 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.

37. I) $(-8)^2 = (-8) \times (-8) \times (-8) = 512$

II) $(-7)^2 = (-7) \times (-7) = 49$

III) $(15)^3 = 15 \times 15 = 3375$

IV) $-(12^2) = -(12 \times 12) = -(144)$