Class VIII Session 2023-24
Subject - Maths
Sample Question Paper - 10

Time Allowed: 3 hours **Maximum Marks: 80**

Section A

1. One (1) is: **[1]**

   a) the identity for the subtraction of rational numbers

   b) the identity for division of rational numbers

   c) the identity for the addition of rational numbers

   d) the identity for multiplication of rational numbers

2. The value of x for which the expressions 3x - 4 and 2x + 1 become equal is **[1]**

   a) 5

   b) -3

   c) 0

   d) 1

3. A trapezium in which non-parallel sides are equal is said to be _____. **[1]**

   a) Scalene trapezium

   b) Equilateral trapezium

   c) Isosceles trapezium

   d) Right trapezium

4. The probability of getting not more than 7 in rolling of a dice is **[1]**

   a) 1

   b) $\frac{1}{2}$

   c) $\frac{1}{7}$

   d) $\frac{1}{4}$

5. By which smallest natural number should 128 be divided so that the quotient is a perfect cube? **[1]**

   a) 6

   b) 4

   c) 3

   d) 2

6. A TV set was bought for ₹26250 including 5% VAT. The original price of the TV set is **[1]**

   a) ₹26245

   b) ₹27562.50

   c) ₹28000

   d) ₹25000

7. Add: a - b + ab, b - c + bc, c - a + ac **[1]**

   a) ab + bc + ac

   b) ab + bc

   c) a + b + c

   d) abc

8. Simplify: $\left[\left\{\left(\frac{-1}{5}\right)^{-2}\right\}^{2}\right]^{-1}$ **[1]**

   a) $\frac{5}{625}$

   b) $\frac{1}{652}$

   c) $\frac{1}{625}$

   d) $\frac{-1}{625}$

9. A train can finish a journey in 10 hours, travelling at a speed of 56 km/h. If another faster train is to cover the same journey in 8 hours, what would be the average speed of the new train? **[1]**

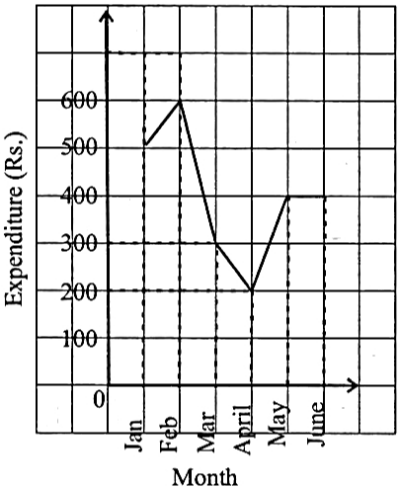
a) 50 km/h

b) 80 km/h

c) 60 km/h

d) 70 km/h

10. The line graph shows the monthly expenditure of the the Vasu family. The difference between their highest and lowest monthly expenditure is: **[1]**



a) ₹ 200

b) ₹ 300

c) ₹ 100

d) ₹ 400

Section B

11. **Fill in the blanks:** **[10]**

(i) A number which can be written in the form of $\frac{a}{b}$ where a and b are integers and b ≠ 0 is called a _____ number. **[1]**

(ii) If $\frac{2}{5}x - 2 = 5 - \frac{3}{5}x$, then x = _____. **[1]**

(iii) The name of three-sided regular polygon is _____. **[1]**

(iv) An experiment whose outcomes cannot be predicted exactly in advance is called a _____ experiment. **[1]**

(v) The unit's digit of the square of a number having digit at unit's place as 4 or 6 is _____. **[1]**

(vi) Discount = Discount% of _____. **[1]**

(vii) 0.000003 is equal to _____ × 10^{-6}. **[1]**

(viii) A car is travelling 48 km in one hour. The distance travelled by the car in 12 minutes is _____ km. **[1]**

(ix) The number of terms in the expression xyz + 1 is _____. **[1]**

(x) The graph of a linear equation is always a _____ line. **[1]**

Section C

12. Verify the property x × (y + z) = x × y + x × z of rational number where $x = \frac{-2}{3}, y = \frac{-4}{6}$ and $z = \frac{-7}{9}$ **[2]**

13. The number 1057 is obviously not perfect square. Give reason. **[2]**

14. Is 46656 a perfect cube? **[2]**

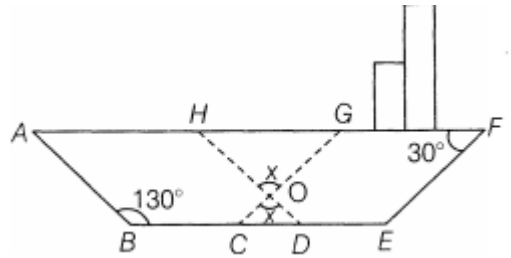
15. Subtract 4a – 7ab + 3b +12 from 12a – 9ab + 5b – 3. **[2]**

16. Water flows from a tank with a rectangular base measuring 80 cm × 70 cm into another tank with a square base of side 60 cm. If the water in the first tank is 45 cm deep, how deep will it be in the second tank? **[2]**

17. Find the common factors of the given term: $3x^2y^3$, $10x^3y^2$, $6x^2y^2z$ **[2]**

18. Solve the equations and check your result: $\frac{2x}{3} + 1 = \frac{7x}{15} + 3$ **[3]**

19. In the following figure of a ship, ABDH and CEFG are two parallelograms. Find the value of x. **[3]**

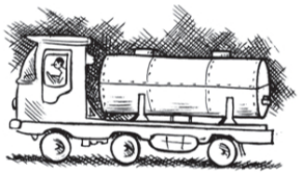


20. There are 500 children in a school. For a P.T. drill they have to stands in such a manner that the number of rows is equal to number of columns. How many children would be left out in this arrangement. **[3]**

21. A man gives 40% of his money to his children and 20% of the remaining to a trust. If he is still left with ₹ 9600, what is the amount did he originally have? **[3]**

22. Add $p^3 - 1$, $p^3 + p + 2$ and $p^2 - 2p + 1$. **[3]**

23. A milk tank is in the form of cylinder whose radius is 1.5 m and length is 7 m. Find the quantity of milk in litres that can be stored in the tank? **[3]**



24. Compare the numbers 2.7×10^{12} and 1.5×10^{8} **[3]**

25. If a and b vary inversely to each other, then find the values of p, q, r ; x, y, z and l, m, n. **[3]**

a	6	8	q	25
b	18	p	39	r

26. In a district, the number of branches of different banks is given below: **[4]**

Bank	State Bank of India	Bank of Baroda	Punjab National Bank	Canara Bank
Number of branches	30	17	15	10

Draw a pie chart for this data.

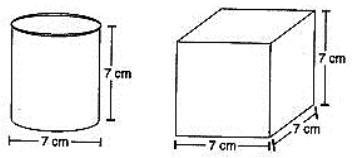
27. Arunima bought household items whose marked price and discount % is as follows **[4]**

Item	**Quantity**	**Rate** (in ₹)	**Discount%**
(i) Atta	1 packet	200	16%
(ii) Detergent	1 packet	371	22.10%
(ii) Namkeen	1 packet	153	18.30%

Find the total amount of the bill she has to pay.

28. What must be added to sum of $x^2 - 4x + 7$ and $2x^2 + 5x - 9$ is to get 0. **[4]**

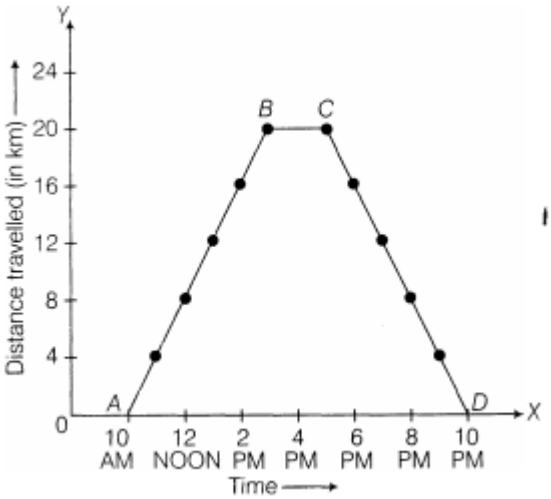
29. Describe how the two figures at the right are alike and how they are different. Which box has larger lateral surface area? **[4]**



30. Factorize $x^4 - y^4$ **[4]**

31. Study the graph given below of a person who started from his home and returned at the end of the day. Answer **[4]**

the questions that follow.



a. At what time did the person start from his home?

b. How much distance did he travel in the first four hours of his journey?

c. What was he doing from 3 PM to 5 PM?

d. What was the total distance travelled by him throughout the day?

e. Calculate the distance covered by him in the first 8 hours of his journey.

f. At what time did he cover 16 km of his journey?

g. Calculate the average speed of the man from A to B and B to C.

h. At what time did he return home?

Solution

Section A

1. **(d)** the identity for multiplication of rational numbers
   Explanation: One (1) is the identity for multiplication of rational numbers. That means, If a is a rational number. Then, a.1 = 1.a = a
2. **(a)** 5
   Explanation: When the value of x is 5 then both the expressions will be equal.
   Proof
   3x - 4 = 2x + 1
   x = 5
3. **(c)** Isosceles trapezium
   Explanation: Isosceles trapezium
4. **(a)** 1
   Explanation: 1
5. **(d)** 2
   Explanation: 128 = $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$
   one 2 is left out and could not make a triplet, so 2 is the smallest natural number by which 128 should be divided so that the quotient is a perfect cube.
6. **(d)** ₹25000
   Explanation: The cost price of TV set = ₹26250.
   VAT including = 5%
   ∴ Original price = $26250 \times \frac{100}{105}$
   = ₹ 25000
   Hence, ₹25000 is correct.
7. **(a)** ab + bc + ac
   Explanation: (a - b + ab) + (b - c + bc) + (c - a + ac)
   opening brackets we get,
   a - b + ab + b - c + bc + c - a + ac
   solving like terms and unlike terms we get,
   a - a - b + b - c + c + ab + bc + ac
   0 + 0 + 0 + ab + bc + ac
   ab + bc + ac
8. **(c)** $\frac{1}{625}$
   Explanation: Given expression can be written as
   $\left[\left(\frac{-1}{5}\right)^{-2}\right]^{2\times(-1)}$ [using $(x^m)^n = x^{m\times n}$]
   $\Rightarrow \left[\left(\frac{-1}{5}\right)^{-2}\right]^{-2} = \left(\frac{-1}{5}\right)^{(-2)\times(-2)}$
   $= \left(\frac{-1}{5}\right)^{4}$
   $= \frac{(-1)^4}{(5)^4}$ [using $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$] $= \frac{1}{625}$

9.

(d) 70 km/h

Explanation: Speed and time are inversely related so with a decrease in time duration the speed has to increase to complete the journey.

In inverse proportion, the value of constant is given by x × y

10 × 56 = 8 × a (where a is the average speed of the train)

$\frac{560}{8}$ = a

70 km / hr = a

10.

(d) ₹ 400

Explanation: Month with highest expenditure= February

Month with lowest expenditure = April

Difference in expenditure = 600 - 200 = 400

Section B

11. Fill in the blanks:

(i) 1. Rational

(ii) 1. 7

(iii) 1. triangle

(iv) 1. Random

(v) 1. 6

(vi) 1. Selling Price

(vii) 1. 3

(viii) 1. 9.6

(ix) 1. 2

(x) 1. Straight

Section C

12. Given, $x = \frac{-2}{3}, y = \frac{-4}{6}$ and $z = \frac{-7}{9}$

Now, LHS = x × (y + z) = $\frac{-2}{3} \times \left(\frac{-4}{6} + \frac{-7}{9}\right) = \frac{-2}{3} \times \left(\frac{-4}{6} - \frac{7}{9}\right)$

$= \frac{-2}{3} \times \left(\frac{-12-14}{18}\right) = \frac{-2}{3} \times \frac{-26}{18} = \frac{26}{27}$

and RHS = x × y + x × z = $\frac{-2}{3} \times \left(\frac{-4}{6}\right) + \left(\frac{-2}{3}\right) \times \left(\frac{-7}{9}\right) = \frac{4}{9} + \frac{14}{27} = \frac{12+14}{27} = \frac{26}{27}$

∴ LHS = RHS

Hence, x × (y + z) = x × y + x × z

13. 1057. The number 1057 is not a perfect square because it ends with 7 whereas the square numbers end with 0, 1, 4, 5, 6 or 9.

14.

2	46656
2	23328
2	11664
2	5832
2	2916
2	1458
3	729
3	243
3	81
3	27
3	9
3	3
	1

By prime factorisation,

46656 = $\underline{2} \times \underline{2} \times \underline{2} \times \underline{2} \times \underline{2} \times \underline{2} \times \underline{3} \times \underline{3} \times \underline{3} \times \underline{3} \times \underline{3} \times \underline{3}$ [grouping the factors in triplets]

$= 2^3 \times 2^3 \times 3^3 \times 3^3$

$= 36^3$ which is a perfect cube.

All the terms form triplets

Therefore, 46656 is a perfect cube.

15.
$$\begin{array}{r} 12a - 9ab + 5b - 3 \\ -\ 4a - 7ab + 3b + 12 \\ \hline 8a - 2ab + 2b - 15 \end{array}$$

16. Dimensions of the rectangular base tank are 80 cm $\times$ 70 cm

Height of rectangle base tank = 45 cm

Each side of square base tank = 60 cm

Let h be the height of the square base tank.

Volume of rectangular base tank = Volume of a square base tank

$\Rightarrow$ 80 $\times$ 70 $\times$ 45 = 60 $\times$ 60 $\times$ h [$\because$ volume of the tank = volume of cuboid = l $\times$ b $\times$ h]

$\Rightarrow \frac{80\times70\times45}{60\times60} = h$

$\therefore$ h = 70 cm

Hence, water in the second tank will be 70 cm deep.

17. $3x^2y^3 = 3 \times x \times x \times y \times y \times y$

$10x^3y^2 = 2 \times 5 \times x \times x \times x \times y \times y$

$6x^2y^2z = 2 \times 3 \times x \times x \times y \times y \times z$

Hence the common factors are x, x, y, y

and $x \times x \times y \times y = x^2y^2$

18. $\frac{2x}{3} + 1 = \frac{7x}{15} + 3$

$\frac{2x}{3} - \frac{7x}{15}$ = 3 - 1 ... [Transposing $\frac{7x}{15}$ to L.H.S. and 1 to R.H.S.]

$\therefore \frac{2x}{3} - \frac{7x}{15}$ = 2

$\therefore 15\left(\frac{2x}{3} - \frac{7x}{15}\right)$ = 2 $\times$ 15 ... [Multiplying both sides by 15]

$\therefore$ 10x – 7x = 30

$\therefore$ 3x = 30

$\therefore$ x = $\frac{30}{3}$ ... [Dividing both sides by 3]

$\therefore$ x = 10 this is the required solution.

Verification,

L.H.S. = $\frac{2x}{3} + 1 = \frac{2}{3}(10) + 1 = \frac{20+3}{3} = \frac{23}{3}$

R.H.S. = $\frac{7x}{15} + 3 = \frac{7}{15}(10) + 3 = \frac{70}{15} + 3 = \frac{70\div5}{15\div5} + 3 = \frac{14+9}{3} = \frac{23}{3}$

Therefore, L.H.S. = R.H.S.

19. We have, two parallelograms ABDH and CEFG.

Now, in ABDH,

$\therefore \angle ABD = \angle AHD = 130°$ [$\because$ opposite angles of a parallelogram are equal]

and $\angle GHD = 180° - \angle AHD = 180° - 130°$ [linear pair]

$\Rightarrow 50° = \angle GHO$

Also, $\angle EFG + \angle FGC = 180°$ [$\because$ adjacent angles of a parallelogram are supplementary]

$\Rightarrow 30° + \angle FGC = 180° \Rightarrow \angle FGC = 180° - 30° = 150°$

and $\angle HGC + \angle FGC = 180°$ [linear pair]

$\therefore \angle HGC = 180° - \angle FGC = 180° - 150° = 30° = \angle HGO$

In ΔHGO, by using angle sum property, $\angle OHG + \angle HGO + \angle HOG = 180°$

$\Rightarrow 50° + 30° + x = 180° \Rightarrow x = 180° - 80° = 100°$

20. Let the number of rows be x

Then the number of columns in x

So, the number of plants is x $\times$ x = x^2

which is a perfect square.

Let us find out the square root of 500 by division method.

$$\begin{array}{r|l} & 22 \\ \hline 2 & \overline{5}\ \overline{00} \\ & -4 \\ \hline 42 & 100 \\ & -84 \\ \hline & 16 \end{array}$$

We get the remainder 16. It shows that 22^2 is less than 500 by 16.

This means that 16 children would be left out in this arrangement.

21. Let the original amount of money with him = ₹ 100

Money given to children = 40% of original money

$= \frac{40}{100} \times 100 = ₹40$

Remaining money = ₹ 100 - ₹ 40 = ₹ 60

Money given to trust = 20% of the remaining money

$= \frac{20}{100} \times 60 = ₹12$

Left over money = ₹ 60 - 12 = ₹ 48

But, given left over money = ₹ 9600

When left over money is Rs. 48, original money = ₹ 100

If leftover money is Rs.9600, the original money $= \frac{9600 \times 100}{48} = ₹20,000$.

22. $$\begin{array}{rr} & p^3 \quad\quad -1 \\ + & p^3 \quad\quad +p+2 \\ + & \quad\quad p^2-2p+1 \\ \hline & 2p^3+p^2-p+2 \end{array}$$

23. For milk tank

r = 1.5 m

h = 7 m

$\therefore$ Capacity $= \pi r^2 h$

$= \frac{22}{7} \times 1.5 \times 1.5 \times 7$

$= \frac{22}{7} \times \frac{15}{10} \times \frac{15}{10} \times 7$

= 49.5 m^3

= 49.5 $\times$ 1000 L . . . . [$\because$ 1 m^3 = 1000 L]

= 49500 L

Hence, the quantity of milk that can be stored in the tank is 49500 litres.

24. $2.7 \times 10^{12} = 2.7 \times (10 \times 10^{11}) = (2.7 \times 10) \times 10^{11} = 27 \times 10^{11}$

$1.5 \times 10^8 = 1.5 \times (10 \times 10^7) = (1.5 \times 10) \times 10^7 = 15 \times 10^7$

Now, 27 > 15 and

$10^{11} > 10^7$

Therefore, $27 \times 10^{11} > 15 \times 10^7$

Hence, $2.7 \times 10^{12} > 1.5 \times 10^8$

25.

a	6	8	q	25
b	18	p	39	r

If a = 6 and b = 18

Then; a $\times$ b = 6 $\times$ 18 = 108

$\Rightarrow$ k = 108

When a = 8 and b = p, then

ab = k

$\Rightarrow$ 8 $\times$ p = 108

$\Rightarrow$ 8 $\times$ p = 108 [putting the value of k]

$\Rightarrow$ p = $\frac{27}{2}$

When a = q and b = 39, then

ab = k

q $\times$ 39 = 108 [putting the value of k]

$\Rightarrow q = \frac{108}{39} = \frac{36}{13}$

When a = 25 and b = r, then

ab = k

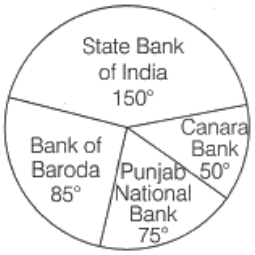
$\Rightarrow 25 \times r = 108$ [putting the value of k]

$\Rightarrow r = \frac{108}{25}$

26. Total number of branches = 30+17 + 15+10 = 72

Bank	Number of branches	Central angle
State Bank of India	30	$\frac{30}{72} \times 360^\circ = 150^\circ$
Bank of Baroda	17	$\frac{17}{72} \times 360^\circ = 85^\circ$
Punjab National Bank	15	$\frac{15}{72} \times 360^\circ = 75^\circ$
Canara Bank	10	$\frac{10}{72} \times 360^\circ = 50^\circ$

The pie chart is as follows:



27. From the given data in the table,

Rate of one packet of atta = ₹200

Discount % = 16%

So, price after discount = 200 - $\frac{16}{100} \times 200$

= 200 - 32

= ₹168

Rate of one packet of detergent = ₹371

Discount % = 22.10%

So, price after discount = 371 - 371 $\times \frac{22.10}{100}$

= 371 - 81.991

= ₹289.009

Rate of one packet of namkeen = 153

Discount% = 18.30%

So, price after discount = 153 - 153 $\times \frac{18.30}{100}$

= 153- 1.53 $\times$ 18.30

= 153 - 27.999

= ₹125.001

$\therefore$ Total bill amount to be paid = ₹168 + ₹289.009 + ₹125.001

= ₹582.01

28. The number = 0 – [(x^2 – 4x + 7) + ($2x^2$ + 5x – 9)]

= 0 – [x^2 – 4x + 7 + $2x^2$ + 5x – 9]

= 0 – [$3x^2$ + x – 2]

= –$3x^2$ – x + 2

29. Similarity $\rightarrow$ Both have same height.

Difference $\rightarrow$ One is a cylinder, the other is a cube.

For the first figure

$r = \frac{7}{2} cm$

h = 7 cm

$\therefore$ Lateral surface area $= 2\pi rh$

$= 2 \times \frac{22}{7} \times \frac{7}{2} \times 7$

$= 154\ cm^2$

For second figure

$l = 7$ cm

$b = 7$ cm

$h = 7$ cm

$\therefore$ Lateral surface area $= 4l^2$

$= 4 \times (7)^2$

$= 196\ cm^2$

Hence, the second box has the larger lateral surface area.

30. $x^4 - y^4 = (x^2)^2 - (y^2)^2$

$= (x^2 - y^2)(x^2 + y^2)$ Using $a^2 - b^2 = (a + b)(a - b)$

$= (x - y)(x + y)(x^2 + y^2)$ Using $a^2 - b^2 = (a + b)(a - b)$

31. After observing the graph carefully, it is clear that

a. At 10 AM, the person starts from his home.

b. In the first 4 h (i.e. till 2 PM), he travelled 16 km.

c. The person was taking rest from 3 PM to 5 PM.

d. The total distance covered by the person throughout the day was 40 km, i.e. 20 km from A to B and then 20 km from C to D.

e. The distance covered by him in the first 8 h i.e. from 10 AM to 6 PM was 24 km.

f. He covered 16 km of his journey at 2 PM.

g. The total distance covered from A to B = 20 km and the time taken to travel from A to B = 5 h

$\therefore$ The average speed of the man from A to B $= \frac{20}{5} = 4$ km/h

and average speed from B to C $= \frac{0}{2} = 0$ km/h

h. He returned home at 10 PM.