Class VIII Session 2023-24
Subject - Maths
Sample Question Paper - 1

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

Section A

1. The property represented by a + b = b + a is **[1]**

   a) closure property
   b) additive identify
   c) associative property
   d) commutative property

2. Solve the following: $(x + 1) + \frac{1}{3}(x - 1) = \frac{5}{12}(x - 2)$ **[1]**

   a) $\frac{5}{12}$
   b) $\frac{-5}{12}$
   c) $\frac{-12}{5}$
   d) $\frac{12}{5}$

3. A diagonal of a rectangle is inclined to one side of the rectangle at 25^o. The acute angle between the diagonals is **[1]**

   a) 25^o
   b) 55^o
   c) 50^o
   d) 40^o

4. Given that, $\sqrt{4096} = 64$, the value of $\sqrt{4096} + \sqrt{40.96}$ is **[1]**

   a) 60.4
   b) 70.4
   c) 74
   d) 64.4

5. The smallest number which when multiplied with 7200 will make the product a perfect cube, is **[1]**

   a) 30
   b) 15
   c) 10
   d) 20

6. A fan is listed at ₹ 1500 and a discount of 20% is offered on the list price. What additional discount must be offered to the customer to bring the net price to ₹ 1104. **[1]**

   a) 15%
   b) 12%
   c) 10%
   d) 8%

7. The base area of a cylindrical wooden block is 254.34 cm^2 and its height is 13 cm. What is its surface area? **[1]**

   a) 2261 cm^2
   b) 1242.62 cm^2
   c) 1251.29 cm^2
   d) 1261.29 cm^2

8. The value of $\frac{6^{12} \times (35)^{28} \times (15)^{16}}{(14)^{12} \times (21)^{11} \times 5^{28}}$ is _____. **[1]**

   a) $3^{17} \times 5^{16} \times 7^5$
   b) $2^7 \times 3^{17} \times 7^5$
   c) $2^6 \times 5^{16} \times 7^{12}$
   d) $2^6 \times 31^{16} \times 5^{12}$

9. 16 men or 24 women can do a piece of work in 20 days. The number of days needed to complete the job, if 20 men and 30 women are employed to do the same piece of work is **[1]**

a) 5 days

b) $\frac{1}{8}$ days

c) 8 days

d) 1 day

10. The irreducible factorisation of $3a^3 + 6a$ is **[1]**

a) $3a\ (a^2 + 2)$

b) $3\ (a^3 + 2)$

c) $a\ (3a^2 + 6)$

d) $3 \times a \times a \times a + 2 \times 3 \times a$

11. **Assertion (A):** All the parallelograms are rhombuses. **[1]**

Reason (R): All the squares are rhombuses.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

12. **Assertion (A):** On ₹ 160000 for one year at the rate of 20% per annum, if the interest is compounded quarterly. **[1]**

Then the compound interest will be ₹ 34481.

Reason (R): Here P = ₹ 160000, R = 5%, n = 4.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

13. Which of the following is not true? **[1]**

a) Rational numbers are closed under multiplication

b) Rational numbers are closed under division

c) Rational numbers are closed under addition

d) Rational numbers are closed under subtraction

Section c

14. Using suitable rearrangement find the sum **[2]**

a. $\frac{4}{7} + \left(\frac{-4}{9}\right) + \frac{3}{7} + \left(\frac{-13}{9}\right)$

b. $-5 + \frac{7}{10} + \frac{3}{7} + (-3) + \frac{5}{14} + \frac{-4}{5}$

15. Solve: $0.16\ (5x - 2) = 0.4x + 7$ **[2]**

16. Both the pairs of opposite angles of a quadrilateral are equal and supplementary. Find the measure of each angle. **[2]**

17. Find the probability of getting an ace from a well shuffled deck of 52 playing cards ? **[2]**

18. Find the square root of 1764 by the Prime Factorisation Method. **[2]**

19. Find out if 6859 is a perfect cube? **[2]**

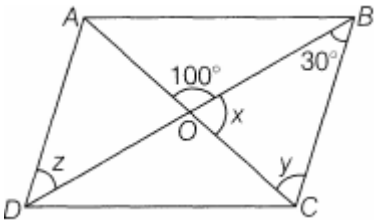
20. By what number should $(-15)^{-1}$ be divided so that quotient may be equal to $(-15)^{-1}$? **[2]**

21. In a scout camp, there is food provision for 300 cadets for 42 days. If 50 more persons join the camp, for how many days will the provision last? **[2]**

Section D

22. Solve: $3x - \frac{x-2}{3} = 4 - \frac{x-1}{4}$ **[3]**

23. ABCD is a parallelogram. Find the values of x, y, and z. **[3]**



24. Is 2352 a perfect square? If not, find the smallest multiple of 2352 which is a perfect square. Find the square root of the new number. **[3]**

25. If Chameli had ₹ 600 left after spending 75% of her money, how much did she have in the beginning? **[3]**

26. The price of a TV is ₹13000. The sales tax charged on it is at the rate of 12%. Find the amount that Vinod will have to pay if he buys it. **[3]**

27. Find the volume of rectangular box with sides are $4p^2q^3$, 3pq and $2p^2q$. **[3]**

28. Factorise: $m^4 - 256$ **[3]**

Section B

29. **State True or False:** **[4]**

(i) x = -12 is the solution of the linear equation 5x - 3 (2x + 1) = 21 + x **[1]**

(ii) The volume of a cube of side 2a is $8a^2$. **[1]**

(iii) The single discount which is equal to two successive discounts 20% and 10% is 30%. **[1]**

(iv) The value of $(-\frac{3}{4})^{-4}$ is $\frac{256}{81}$. **[1]**

30. **Fill in the blanks:** **[4]**

(i) _____ numbers are closed under addition. **[1]**

(ii) If 5t – 3 = 3t – 5 , then t = ? **[1]**

(iii) If the area of a face of a cube is 10 cm^2, then the total surface area of the cube is _____ cm^2. **[1]**

(iv) When the speed remains constant, the distance travelled is _____ proportional to the time. **[1]**

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

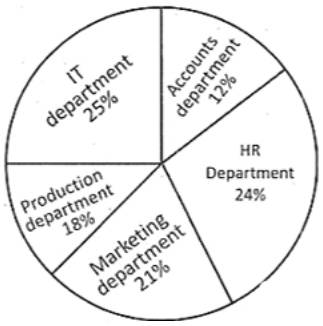
32. A rectangular piece of paper of dimensions 22cm by 10cm is rolled along its length to form a cylinder. Find the volume of cylinder formed. **[4]**

33. Factorize $x^4 – y^4$ **[4]**

Section E

Question No. 34 to 38 are based on the given text. Read the text carefully and answer the questions: **[5]**

Read the following pie chart carefully:



Percentage of Employees in different departments of an organization = 3600

34. What is the number of employees of accounts department?

a) 362 b) 432

c) 512 d) 482

35. The ration of the number of employees of Production department to HR Department is _____.

a) 4 : 7 b) 3 : 8

c) 3 : 4 d) 7 : 12

36. If 400 new employees are hired in the marketing department, then find the ratio of number of employees of the marketing department to the number of employees in the IT department.

a) 19 : 16 b) 17 : 196

c) 17 : 15 d) 289 : 225

37. If 300 employees are shifted from HR department to production department, then new ratio of number of employees of HR department to the production department is _____.

a) 91 : 37 b) 97 : 29

c) 38 : 17 d) 28 : 59

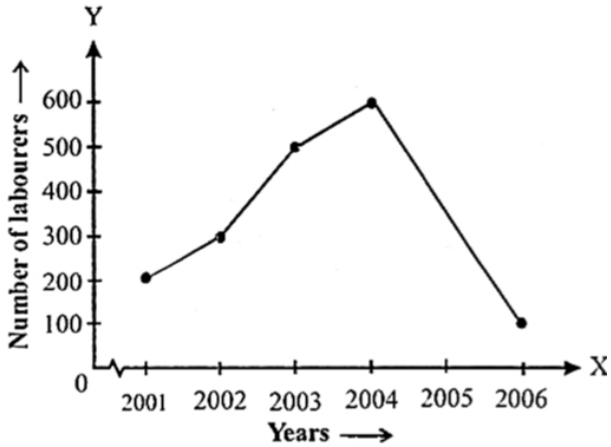
38. If 200 new employees are hired in accounts department and 100 employees of IT department left the organization, then new ratio of number of employees of IT department to accounts department is _____.

a) 79 : 100 b) 81 : 100

c) 85 : 97 d) 77 : 97

Question No. 39 to 43 are based on the given text. Read the text carefully and answer the questions: **[5]**

Read the graph:



39. In which year was the number of labourers maximum?

a) 2002 b) 2003

c) 2001 d) 2004

40. In Which year was the number of labourers minimum?

a) 2004 b) 2005

c) 2003 d) 2006

41. What was the difference of the number of labourers in the years 2002 and 2003?

a) 400 b) 200

c) 100 d) 300

42. Find the rise in the number of labourers from 2001 to 2004.

a) 500 b) 300

c) 200 d) 400

43. Find the sum of the number of labourers in the years 2004 and 2006.

a) 500 b) 200

c) 700 d) 600

Solution

Section A

1.

(d) commutative property

Explanation: commutative property

2.

(c) $\frac{-12}{5}$

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

$\frac{x}{2}+\frac{1}{2}+\frac{x}{3}-\frac{1}{3}=\frac{5x}{12}-\frac{10}{12}$

$\frac{x}{2}+\frac{x}{3}-\frac{5x}{12}=\frac{-10}{12}+\frac{1}{3}-\frac{1}{2}$

$\frac{6x+4x-5x}{12}=\frac{-10+4-6}{12}$

$\frac{5x}{12}=\frac{-12}{12}$

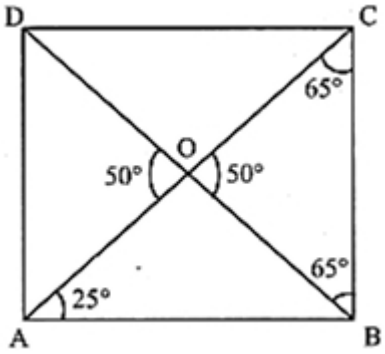
$\frac{5x}{12}=-1$

x = $\frac{-12}{5}$.

3.

(c) 50^o

Explanation:



Since, ∠CAB = 25^o, clearly ∠OCB = 65^o.

Let diagonals meet at O. Triangle OCB is an isosceles triangle.

∴ ∠OBC = 65^o

Hence, ∴ ∠BOC = 50^o

4.

(b) 70.4

Explanation: Given, $\sqrt{4096}$= 64

So, $\sqrt{4096}+\sqrt{40.96}$

= $64+\sqrt{4096\times10^{-2}}$

= $64+\sqrt{4096}\sqrt{10^{-2}}$

= $=64+64\times10^{-1}$

= 64 + 6.4 = 70.4

5. **(a)** 30

Explanation: Expressing 7200 as its prime factors

7200 = 2 × 2 × 2 × 2 ×2 × 3 × 3 × 5× 5

7200 = (2 × 2 × 2) × (2 × 2)× (3 × 3)× (5 × 5)

We find that prime factors 2, 3 & 5 appear in groups of two, so to make the given no. perfect cube, we must multiply it with

2× 3 × 5 = 30

∴ 7200 x 30 = $(2 \times 2 \times 2) \times (3 \times 3 \times 3) \times (2 \times 2 \times 2) \times (5 \times 5 \times 5)$
is a perfect cube.

6.

(d) 8%

Explanation: M.P. = ₹ 1500,

Discount = 20%

∴ S.P. = 80% of ₹1500 = $\frac{80}{100} \times 1500$

= ₹ 1200

Final S.P = ₹ 1104

∴ Additional discount = ₹ 1200 - ₹ 1104

= ₹ 96

∴ Additional discount rate = $\frac{96}{1200} \times 100$

= 8%

7.

(b) 1242.62 cm^2

Explanation: base area of a cylindrical wooden block = 254.34 cm^2 and height = 13 cm

base area of cylinder = πr^2

$254.34 = \frac{22}{7} \times (r)^2$

$\frac{254.34 \times 7}{22} = (r)^2$

$\frac{1780.38}{22} = r^2$

80.92 = r^2

$\sqrt{80.92} = r$

8.99cm = radius

the surface area of cylinder $= 2\pi r(r + h)$

$254.34 = \frac{22}{7} \times (r)^2$

$\frac{254.34 \times 7}{22} = r^2$

$\frac{1780.38}{22} = r^2$

80.92 = r^2

$\sqrt{80.92} = r$

8.99 cm = radius

the surface area of cylinder = $2\pi r(r + h)$

$2 \times \frac{22}{7} \times 8.99(8.99 + 13)$

S = $\frac{395.56}{7}(21.99)$

S = $\frac{395.56}{7}$ = 21.99

S = $\frac{8608.36}{7}$

S = 1242.62 cm^2

The surface area of the cylindrical wooden block is 1242.62 cm^2

8. **(a)** $3^{17} \times 5^{16} \times 7^5$

Explanation: $\frac{6^{12} \times (35)^{28} \times (15)^{16}}{(14)^{12} \times (21)^{11} \times 5^{28}} = \frac{2^{12} \times 3^{12} \times 5^{28} \times 7^{28} \times 3^{16} \times 5^{16}}{7^{12} \times 2^{12} \times 7^{11} \times 3^{11} \times 5^{28}}$

= $2^{12 - 12} \times 3^{12 + 16 - 11} \times 5^{28 + 16 - 28} \times 7^{28 - 12 - 11}$

= $3^{17} \times 5^{16} \times 7^5$

9.

(c) 8 days

Explanation: 16 men do a work in 20 days.

∴ 16 men do $\frac{1}{20}$th work in 1 day.

1 man does $\frac{1}{320}$th work in 1 day

∴ 20 men do $\frac{20}{320}$th work in 1 day.

Similarly, 30 women do $\frac{30}{480}$th work in 1 day.

Now, 20 men and 30 women together do = $\frac{1}{16} + \frac{1}{16}$

= $\frac{2}{16} = \frac{1}{8}$ work in 1 day

∴ Together they do work in 8 days.

10. **(a)** 3a (a^2 + 2)

Explanation: The irreducible factorisation of $3a^3$ + 6a = 3a (a^2 + 2).

11.

(d) A is false but R is true.

Explanation: All rhombuses are parallelograms but all parallelograms are not rhombuses. So, (A) is false.

All squares are rhombuses as all sides of a square are of equal lengths. All squares are also rectangles as each internal angle measures 90°. So, (R) is true.

12.

(b) Both A and R are true but R is not the correct explanation of A.

Explanation: Given details are:

Principal (P) = ₹ 160000

Rate (R) = $\frac{20}{4}$ = 5% (for quarter year)

Time n = 1 year = 1 × 4 = 4 quarters

By using the formula,

A = $P\left(\frac{1+R}{100}\right)^n$

= $160000\left(\frac{1+5}{100}\right)^4$

= $160000\left(\frac{105}{100}\right)^4$

= ₹ 194481

∴ Compound Interest = A - P = ₹ 194481 - ₹ 160000 = ₹ 34481

13.

(b) Rational numbers are closed under division

Explanation: Rational numbers are not closed under division.

As, 1 and 0 are the rational numbers but $\frac{1}{0}$ is not defined.

Section c

14. a. $\frac{4}{7} + \left(\frac{-4}{9}\right) + \frac{3}{7} + \left(\frac{-13}{9}\right) = \frac{4}{7} + \frac{3}{7} + \left(\frac{-4}{9}\right) + \left(\frac{-13}{9}\right)$

$= \frac{7}{7} - \frac{17}{9} = 1 - \frac{17}{9} = \frac{9-17}{9} = \frac{-8}{9}$

b. $-5 + \frac{7}{10} + \frac{3}{7} + (-3) + \frac{5}{14} + \left(\frac{-4}{5}\right) = -5 + (-3) + \frac{7}{10} + \left(\frac{-4}{5}\right) + \frac{3}{7} + \frac{5}{14} = -8 + \frac{7-8}{10} + \frac{6+5}{14} = -8 - \frac{1}{10} + \frac{11}{14}$

$= \frac{-560-7+55}{70} = \frac{-512}{70} = \frac{-256}{35}$

15. Given, 0.16 (5x - 2) = 0.4x + 7

⇒ 0.8x - 0.32 = 0.4x + 7

⇒ 0.8x - 0.4x = 0.32 + 7 [transposing 0.4x to LHS and - 0.32 to RHS]

⇒ 0.4x = 7.32

⇒ $\frac{0.4x}{0.4} = \frac{7.32}{0.4}$ [dividing both sides by 0.4]

∴ x = 18.3

16. Let ABCD be a quadrilateral, such that

∠A = ∠C, ∠B = ∠D and also ∠A + ∠C = 180°, ∠B + ∠D = 180°

Now, ∠A + ∠A= 180°

⇒ 2∠A = 180°

⇒ ∠A = 90°

Similarly, ∠B = 90°

Hence, each angle is a right angle.

17. Probability of getting an ace from a well shuffled deck of 52 playing cards $= \frac{4}{52} = \frac{1}{13}$ [∵ There are in all 4 ace cards]

18. 1764

The prime factorisation of 1764 is

1764 = 2 × 2 × 3 × 3 × 7 × 7

By pairing the prime factors, we get

2	1764
2	882
3	441
3	147
7	49
	7

1764 = $\underline{2} \times \underline{2} \times \underline{3} \times \underline{3} \times \underline{7} \times \underline{7}$

So, $\sqrt{1764}$ = 2 × 3 × 7= 42

19.

19	6859
19	361
19	19
	1

By prime factorisation,

6859 = $\underline{19} \times \underline{19} \times \underline{19}$ [grouping the factors in triplets]

= 19^3 which is a perfect cube.

Therefore, 6859 is a perfect cube.

20. Let $(-15)^{-1}$ be divided by x to get quotient $(-15)^{-1}$

So, $\frac{(-15)^{-1}}{x} = (-15)^{-1}$

$\Rightarrow \quad \frac{(-15)^{-1}}{(-15)^{-1}} = x$

$\Rightarrow \quad x = (-15)^{-1+1}$ [$\because a^m \div a^n = (a)^{m-n}$]

$\Rightarrow \quad x = (-15)^0 = 1$ [$\because a^0 = 1$]

21. As we know that more the number of persons, the sooner would be the provision exhausted.

So, this is a case of inverse proportion.

Let the required number of days be x.

Hence, 300 × 42 = (300 + 50) × x

300 × 42 = 350 × x

$\frac{300 \times 42}{350} = x$

x = 36

Section D

22. Given, $3x - \frac{x-2}{3} = 4 - \frac{x-1}{4}$

$\Rightarrow \quad \frac{9x-(x-2)}{3} = \frac{16-(x-1)}{4}$

$\Rightarrow$ 4(9x - x + 2) = 3(16 -x + 1) [by cross-multiplication]

$\Rightarrow$ 4(8x + 2) = 3(- x + 17)

$\Rightarrow$ 32x + 8 = - 3x + 51

$\Rightarrow$ 32x + 3x = 51 - 8 [transposing -3x to LHS and 8 to RHS]

$\Rightarrow$ 35x = 43

$\Rightarrow \frac{35x}{35} = \frac{43}{35}$

$\therefore \quad x = \frac{43}{35}$

23. Given, a parallelogram ABCD.

In the $\triangle$OBC, we have

y + 30° = 100° [exterior angle property of triangle]

$\Rightarrow$ y = 70°

By the angle sum property of a triangle,

we have, x + y + 30 = 180°

$\Rightarrow$ x + 70°+30° = 180° $\Rightarrow$ x = 180° - 100° = 80°

Now, since AD||BC and BD is transversal, therefore

$\angle$ADO = $\angle$OBC [alternate interior angles]

$\Rightarrow$ z = 30°

24.

2	2352
2	1176
2	588
2	294
3	147
7	49
	7

We have 2352 = $\underline{2} \times \underline{2} \times \underline{2} \times \underline{2} \times 3 \times \underline{7} \times \underline{7}$

As the prime factor 3 has no pair, 2352 is not a perfect square. If 3 gets a pair then the number will become perfect square. So, we multiply 2352 by 3 to get,

2352 × 3 = $\underline{2} \times \underline{2} \times \underline{2} \times \underline{2} \times \underline{3} \times \underline{3} \times \underline{7} \times \underline{7}$

Now each prime factor is in a pair. Therefore, 2352 × 3 = 7056 is a perfect square. Thus the required smallest multiple of 2352 is 7056 which is a perfect square.

And, $\sqrt{7056} = 2 \times 2 \times 3 \times 7 = 84$

25. Total percentage of money she didn't spent

= 100% - 75% = 25%

According to question,

$\Rightarrow$ 25% = 600

$\Rightarrow 1\% = \frac{600}{25}$

$\Rightarrow 100\% = \frac{600}{25} \times 100$ = 2400

Hence, the money she had in the beginning was ₹ 2400.

26. Price of TV = ₹ 13000

Sales tax charged on it = 12% of ₹ 13000

$= ₹\frac{12}{100} \times 13000$

= ₹ 1560

∴ Sale price + sales tax

= ₹ 13000 + ₹ 1560

= ₹ 14560

Hence, the amount that Vinod will have to pay if he buys it is ₹ 14560.

27. Volume of rectangular box = l × b × h

= $(4p^2q^3) \times (3pq) \times (2p^2q)$

= $(4 \times 3 \times 2)\ (p^2q^3 \times pq \times p^2q)$

= $24\ p^5q^5$

28. We know that, $m^4 = (m^2)^2$

and $256 = (16)^2$

Therefore, $m^4 - 256 = (m^2)^2 - (16)^2$

= $(m^2 + 16)(m^2 - 16)$[using identity $a^2 - b^2 = (a + b)(a - b)$]

= $(m^2 + 16)(m^2 - 4^2)$

= $(m^2 + 16)(m + 4)(m - 4)$[again, using identity $a^2 - b^2 = (a + b)(a - b)$]

Section B

29. State True or False:

(i) **(a)** True
Explanation: True

(ii) **(b)** False
Explanation: False

(iii) **(b)** False
Explanation: False

(iv) **(a)** True
Explanation: True

30. Fill in the blanks:

(i) 1. Rational

(ii) 1. -1

(iii) 1. 60

2. sixty

(iv) 1. Directly

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

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

$= 0 – [3x^2 + x – 2]$

$= –3x^2 – x + 2$

32. length of paper = height of cylinder = 10cm

Circumference of its base = 22cm

$2\pi(r) = 22$

$2r = \frac{22}{\pi}$

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

r = 3.5cm

Volume of cylinder = $\pi(radius)^2(height)$

$= \frac{22}{7} \times 3.5 \times 3.5 \times 10$

$= \frac{770}{2}$

$= 385cm^3$

33. $x^4 – y^4 = (x^2)^2 – (y^2)^2$

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

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

Section E

34. **(b)** 432

Explanation: 432

35. **(c)** 3 : 4

Explanation: 3 : 4

36. **(d)** 289 : 225

Explanation: 289 : 225

37. **(b)** 97 : 29

Explanation: 97 : 29

38. **(a)** 79 : 100

Explanation: 79 : 100

39. **(d)** 2004

Explanation: 2004 $\rightarrow$ 500

40. **(d)** 2006

Explanation: 2006 $\rightarrow$ 100

41. **(b)** 200

Explanation: No. of the labourers 2002 = 300

Number of the labourers 2003 = 500

Difference of the number of labourers in year 2002 and 2003 = 500 - 300 = 200

42. **(d)** 400

Explanation: Number of the labourers 2001 = 200

Number of labourers in 2004 = 600

Rise in the labourers from 2001 to 2004 = 600 - 200 = 400

43. **(c)** 700

Explanation: Number of labourers in 2004 = 600

Number of labourers in 2006 = 100

Sum of the number of labourers in 2004 and 2006 600 + 100 = 700