Class VIII Session 2023-24
Subject - Maths
Sample Question Paper - 6

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

Section A

1. _____ = a for any rational number a. **[1]**

   a) a × 2 b) a × 3

   c) a × 0 d) a × 1

2. Solve: $\frac{x}{2} + \frac{x}{4} + \frac{x}{5} + 10000 = x$ **[1]**

   a) -1000 b) 20000

   c) 2000 d) 200000

3. A number from 1 to 11 is chosen at random. What is the probability of choosing an odd number? **[1]**

   a) $\frac{1}{11}$ b) $\frac{6}{11}$

   c) $\frac{1}{5}$ d) $\frac{5}{11}$

4. Which of the following would end with digit 4? **[1]**

   A. 302^2

   B. 305^2

   C. 306^2

   D. 307^2

   a) A b) D

   c) C d) B

5. The square root of 73.96 is **[1]**

   a) 8.60 b) 8.6

   c) 86 d) 0.86

6. $\sqrt[3]{1 - \frac{91}{216}}$ is equal to- **[1]**

   a) $\frac{1}{6}$ b) $\frac{11}{6}$

   c) $\frac{5}{6}$ d) $\frac{7}{6}$

7. Lakshmi buys an article with 25% discount on the marked price. She makes a profit of 10% by selling it at ₹660. What was the marked price? **[1]**

   a) ₹800 b) ₹700

   c) ₹600 d) ₹900

8. If Nidhi purchases a book of ₹500 and GST is 12 per cent. She will pay ₹_____ **[1]**

a) 660 b) 640

c) 60 d) 560

9. Add: ab - bc, bc - ca, ca - ab **[1]**

a) 0 b) 2bc

c) 2ac d) 2ab

10. Multiply: $\sqrt{3}x^2y^2 - \sqrt{2}x^3y^2 + \sqrt{5}x^3y^3 + 2 - \sqrt{2}x^2y^2$ **[1]**

a) $\sqrt{6}xy + 15x^5y^4 = \sqrt{10}x^5y^5$ b) $-\sqrt{6}x^4y^4 + 2x^5y^4 - \sqrt{10}x^5y^5$

c) $-\sqrt{6}x^4y^4 + 2x^5y^4 + \sqrt{10}xy$ d) $\sqrt{6}xy + 2x^6y^6 - 10xy$

11. A rectangular room is 10 m wide and 6 m high. If the area of its four walls is 540 m^2, then its length will be: **[1]**

a) 70 m b) 40 m

c) 45 m d) 35 m

12. Find the volume of a cuboid whose length is 8 cm, breadth 6 cm and height 3.5 cm. **[1]**

a) 168 cm^3 b) 215 cm^2

c) 168 cm^2 d) 150 cm^2

13. Find the multiplicative inverse of 7^{-2}. **[1]**

a) 7^4 b) 7^5

c) 7^2 d) 7^3

14. In 2^n, n is known as **[1]**

a) Variable b) Base

c) Exponent d) Constant

15. Imran brought 40 toys each cost ₹ 4. How many toys Imran can buy at ₹ 8 each from the same amount? **[1]**

a) 80 b) 70

c) 20 d) 90

16. 72 books are packed in 4 cartons of the same size. How many cartons are required for 360 books? **[1]**

a) 18 b) 20

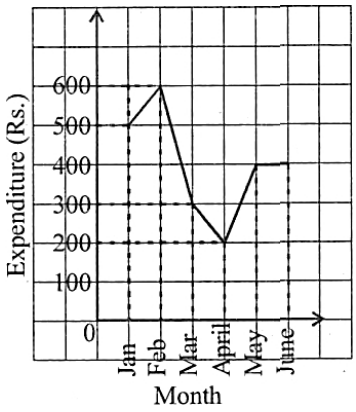
c) 22 d) None of these

17. Value of $(99.8)^2$ - $(0.2)^2$ is: **[1]**

a) 9980 b) 9860

c) 9960 d) 9680

18. The line graph shows the monthly expenditure of Vasu family. The total expenditure over the first 3 months is: **[1]**



a) ₹ 1100

b) ₹ 320

c) ₹ 1400

d) ₹ 600

Section B

19. **Assertion (A):** Out of the three equal angles of a quadrilateral, each measures 70^o. The measure of the fourth angle is 150. **[1]**

Reason (R): In geometry a quadrilateral is a four-sided polygon, having four edges (sides) and four corners (vertices).

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.

20. **Assertion:** The amount of ₹ 10000 with interest rate of 5% per annum will be ₹ 11573.25. **[1]**

Reason: $A_n = P\left(\frac{1+R}{100}\right)^n$.

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.

Section C

21. The product of two rational numbers is -7. If one of the number is -5, find the other? **[2]**

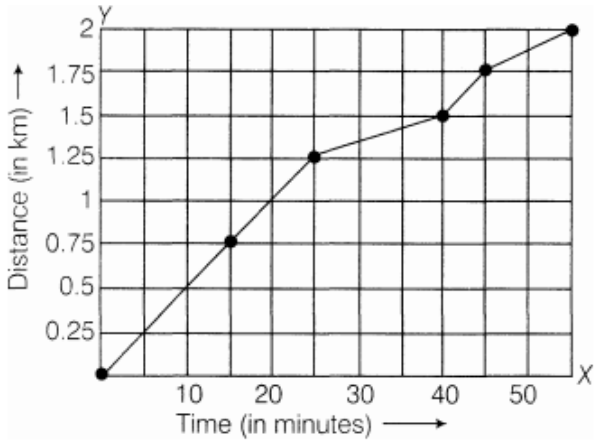
22. Find if 9000 is perfect cube? **[2]**

23. The distance between the Sun and the Earth is 1.496×10^8 km and distance between the Earth and the Moon is 3.84×10^8 m. During solar eclipse, the Moon comes in between the Earth and the Sun. What is the distance between the Moon and the Sun at that particular time? **[2]**

24. If Naresh walks 250 steps to cover a distance of 200 metres, find the distance travelled in 350 steps. **[2]**

25. Factorise $x^2 + 12x + 36$, using the identity $a^2 + 2ab + b^2 = (a + b)^2$ **[2]**

26. The following is the time-distance graph of Sneha's walking. **[2]**



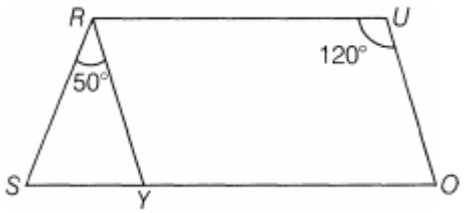
a. When does Sneha make the least progress ? Explain your reasoning.

b. Find her average speed in km/h.

27. The cost of 2⅓ meters of cloth is ₹ 75¼. Find the cost of cloth per meter. **[3]**

28. Solve: $5x + \frac{7}{2} = \frac{2}{2}x - 14$ **[3]**

29. In the given parallelogram YOUR, ∠RUO = 120^o and OY is extended to point S, such that ∠SRY = 50^o. Find ∠YSR. **[3]**



30. Find the value of $\sqrt{\sqrt{144} + \sqrt{25}}$ **[3]**

31. The population of a place increased to 54,000 in 2003 at a rate of 5% per annum. Find the population in 2001. **[3]**

32. The sides of rectangle are $3a^2 + 2b$ and $5a^2 - 4b$. Find its perimeter. **[3]**

33. Find the surface area of a chalk box whose length, breadth and height are 16cm, 8cm and 6cm respectively. **[3]**

34. Work out the division: $9x^2y^2(3z - 24) \div 27xy\ (z - 8)$ **[3]**

35. ABCD is a rhombus such that the perpendicular bisector of AB passes through D. Find the angles of the rhombus. **[4]**

Hint: Join BD. Then △ABD is equilateral.

36. Following cards are put facing down: **[4]**

A	E	I	O	U

What is the chance of drawing out

i. a vowel

ii. A

iii. a card marked U

iv. a consonant

37. Sunscreens block harmful ultraviolet (UV) rays produced by the sun. Each sunscreen has a Sun Protection Factor (SPF) that tells you how many minutes you can stay in the sun before you receive one minute of burning UV rays. e.g. If you apply sunscreen with SPF 15, you get one minute of UV rays for every 15 minutes you stay in the sun. **[4]**

i. A sunscreen with SPF 15 allows only $\frac{1}{15}$ of the sun's UV rays. What 15 per cent of UV rays does the sunscreen abort?

ii. Suppose, a sunscreen allows 25% of the sun's UV rays.

a. What fraction of UV rays does this sunscreen block? Give your answer in lowest terms.

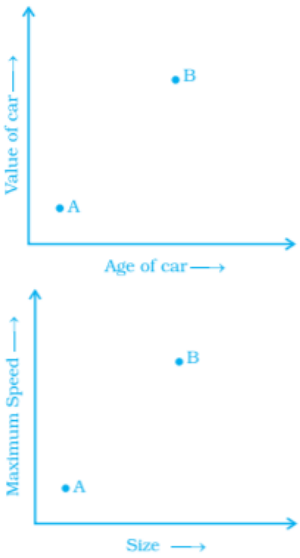
b. Use your answer from part (a) calculate this sunscreen's SPF. Explain how you found your answer?

iii. A label on a sunscreen with SPF 30 claims that the sunscreen blocks about 97% of harmful UV rays. Assuming the SPF factor is accurate, is this claim true. Explain.

38. Find the total surface area and volume of a cube with base perimeter equal to 40 cm. **[4]**

39. Factorise: $25a^2 - 4b^2 + 28bc - 49c^2$ **[4]**

40. The two graphs below compare Car A and Car B. The left graph shows the relationship between age and value. The right graph shows the relationship between size and maximum speed. **[4]**



Use the graphs to determine whether each statement is true or false, and explain your answer.

i. The older car is less valuable.

ii. The faster car is larger.

iii. The larger car is older.

iv. The faster car is older.

v. The more valuable car is slower.

Solution

Section A

1.

(d) a × 1

Explanation: The answer is a × 1 = a, as 1 is the multiplicative identity of rational numbers that is, any number multiplied by 1 gives the same number as a product.

2.

(d) 200000

Explanation: $\frac{x}{2} + \frac{x}{4} + \frac{x}{5} + 10000 =$ x

$\frac{x}{2} + \frac{x}{4} + \frac{x}{5} - x =$ 1000

$\frac{10x+5x+4x-20x}{20}$ = -10000

$\frac{19x-20x}{20}$ = -10000

$\frac{-x}{20}$ = -10000

x = 200000

3.

(b) $\frac{6}{11}$

Explanation: $\frac{6}{11}$

4. **(a)** A

Explanation: The answer is 302^2 as here the unit's digit is 2 and 2^2 = 4. So, 302^2 would end with digit 4.

5.

(b) 8.6

Explanation: By using long division method,

	8.6
8	$\overline{73.96}$
+8	64
166	996
	996
	×

Hence, $\sqrt{73.96}$ = 8.6

6.

(c) $\frac{5}{6}$

Explanation: $\sqrt[3]{1 - \frac{91}{216}} = \sqrt[3]{\frac{216-91}{216}}$

= $\sqrt[3]{\frac{125}{216}} = \frac{5}{6}$

7. **(a)** ₹800

Explanation: ∵ SP = ₹660, Profit % = 10%

⇒ CP = ₹600

∴ MP = $\frac{600\times100}{75}$ = ₹800

8.

(d) 560

Explanation: Cost of book = ₹500

GST = 12%

∴ GST for book = 12% of ₹500

= $500 \times \frac{12}{100}$ = 5 × 12 = ₹60

∴ Pay by Nidhi = Cost of book + GST for book
= 500 + 60 = ₹560

9. **(a)** 0
Explanation: (ab - bc) + (bc - ca) + (ca - ab)
opening brackets we get,
ab - bc + bc - ca + ca - ab
solving like terms we get,
ab - ab - bc + bc - ca + ca
0 + 0 + 0 = 0

10. **(b)** $-\sqrt{6}x^4y^4 + 2x^5y^4 - \sqrt{10}x^5y^5$
Explanation: $-\sqrt{6}x^4y^4 + 2x^5y^4 - \sqrt{10}x^5y^5$

11. **(d)** 35 m
Explanation: 35 m

12. **(a)** 168 cm^3
Explanation: Length of the cuboid = 8 cm
Breadth of the cuboid = 6 cm
Height of the cuboid = 3.5 cm
Volume of the cuboid = length $\times$ breadth $\times$ height
= $8 \times 6 \times 3.5 = 168cm^3$
Therefore,volume of the cuboid = $168cm^3$

13. **(c)** 7^2
Explanation: Multiplicative inverse means reciprocal. So multiplicative inverse of $7^{-2} = 7^2$

14. **(c)** Exponent
Explanation: We know that a is called the nth power of a^n, and is also read as a raised to the power n. The rational number a is called the base and n is called the exponent (power or index). in the same way in 2^n, n is known as exponent.

15. **(b)** 70
Explanation:

Price of one toy	No. of toys
14	40
Decrease ↓ 8	x ↓ Increase

By the principle of inverse proportion, we have $14 \times 40 = 8$ x
x = $\frac{14\times40}{8}$ = 70 toys

16. **(b)** 20
Explanation: This is a question of direct proportion as with the increase in the number of books the number of cartons will increase
So, in direct proportion, the constant is given by $\frac{x}{y}$
$\frac{72}{4} = \frac{360}{a}$ (where a is the number of cartons required)
$72 \times a = 360 \times 4$
a = $\frac{1440}{72}$
a = 20

17.

(c) 9960

Explanation: $(99.8)^2 - (0.2)^2$

$= (99.8 + 0.2)(99.8 - 0.2)$

$= 100 \times 99.6 = 9960$

18.

(c) ₹ 1400

Explanation: Total expenditure over the first three months = (500 + 600 + 300) = 1400.

Section B

19.

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

Explanation: The sum of the interior angles of a quadrilateral is 360^o. The sum of the given angle is $70^o + 70^o + 70^o + 150^o = 360^o$. So, (A) is true.

A quadrilateral is a four-sided polygon, having four sides and four vertices. So, (R) is also true but it's not a correct explanation of (A).

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

Explanation: P = 10000, R = 5, n = 3

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

$= 10{,}000\left(\frac{1+5}{100}\right)^3$

= ₹ 11573.25

Section C

21. Give, one number = -5

Suppose, the other number be x.

According to the question,

$-5x = -7$

$\Rightarrow x = \frac{-7}{-5} \Rightarrow x = \frac{7}{5}$

Hence, the required number is $\frac{7}{5}$

22.

2	9000
2	4500
2	2250
3	1125
3	375
5	125
5	25
5	5
	1

By prime factorisation,

9000 = $\underline{2} \times \underline{2} \times \underline{2} \times 3 \times 3 \times \underline{5} \times \underline{5} \times \underline{5}$ [grouping the factors in triplets]

In the above factorisation, 3×3 remain after grouping 2's and 5's in triplets.

Therefore, 9000 is <u>NOT</u> a perfect cube.

23. The distance between the Sun and the Earth is 1.496×10^8 km

$= 1.496 \times 10^8 \times 10^3$ m $= 1496 \times 10^8$m

The distance between the Earth and the Moon is 3.84×10^8 m

The distance between the Moon and the Sun at a particular time (solar eclipse) = $(1496 \times 10^8 - 3.84 \times 10^8)$m

$= 1492.16 \times 10^8$m

24. ∵ Naresh walks 250 steps to cover distance = 200 m

∴ In 1 step, he covers the distance = $\frac{200}{250}m$

$\because$ in 350 steps, he covers = $\frac{200}{250} \times 350 = \frac{20 \times 350}{25}$

$= \frac{7000}{25} = 280\text{m}$

25. We have, $x^2 + 12x + 36$

$= (x)^2 + 2 \times 6x + (6)^2$ [using identity $a^2 + 2ab + b^2 = (a + b)^2$]

$= (x + 6)^2$

$= (x + 6)(x + 6)$

26. a. Sneha made the least progress between 25 min to 40 min. Observing the graph carefully, we see that initially, she is travelling approximately 0.5 km in 10 min, 0.25 km in 5 min, till the first 25 min. But after 25 min, her speed decreased as she travelled 0.25 km in 15 min (between 25 min to 40 min).

b. Average speed = $\frac{\text{Total distance travelled}}{\text{Time}} = \frac{2}{55/60} = \frac{2}{55} \times 60$ = 2.18 km/h

27. Let the cost of cloth per meter be x.

According to question

2⅓x = 75¼

$\frac{7}{3}x = \frac{301}{4}$

$x = \frac{(3 \times 301)}{(7 \times 4)}$

= ₹ 32.55

28. $5x + \frac{7}{2} = \frac{3}{2}x - 14$

Multiplying both sides of the equation by 2, we get

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

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

10x + 7 = 3x - 28

10x – 3x = -28 - 7

7x = -35

$x = \frac{-35}{7}$

x = -5

29. Given, ∠RUO = 120° and ∠SRY = 50°

∠RYO = ∠RUO = 120° [$\because$ opposite angles of a parallelogram]

Now, ∠SYR = 180° - ∠RYO [linear pair]

= 180°-120°= 60°

In △SRY,

By the angle sum property of a triangle, ∠SRY + ∠RYS + ∠YSR = 180°

$\Rightarrow$ 50°+ 60° + ∠YSR = 180°

∠YSR = 180° - (50° + 60°) = 70°

30. $\sqrt{\sqrt{144} + \sqrt{25}}$

$= \sqrt{\sqrt{3 \times 3 \times 4 \times 4} + \sqrt{5 \times 5}}$

$\sqrt{3 \times 4 + 5}$

$\sqrt{17}$

31. Let the population in 2001 be P.

R = 5% p.a.

n = 2 years

$\therefore A = P\left(1 + \frac{R}{100}\right)^n = P\left(1 + \frac{5}{100}\right)^2$

$= P\left(1 + \frac{1}{20}\right)^2 = P\left(\frac{21}{20}\right)^2$

According to question,

$P\left(\frac{21}{20}\right)^2$ = 54000

$\therefore P = 54000\left(\frac{20}{21}\right)^2 = 54000 \times \frac{20}{21} \times \frac{20}{21}$ = 48980 (approx)

Hence, the population in 2001 was 48980.

32. Perimeter of a rectangle = 2(Sum of the sides)

= 2 [$(3a^2 + 2b) + (5a^2 - 4b)$]

= 2 [$3a^2 + 2b + 5a^2 - 4b$]

= 2 [$8a^2 - 2b$]

= $16a^2 - 4b$

33. Since chalk box is in form of cuboid.

Surface area of chalk box = 2(lb + bh + hl)

Surface area of chalk box $= 2(16 \times 8 + 8 \times 6 + 6 \times 16) cm^2$

Surface area of chalk box = 2(128 + 48 + 96) cm^2

Surface area of chalk box = 2(272) cm^2

Surface area of chalk box = 544 cm^2

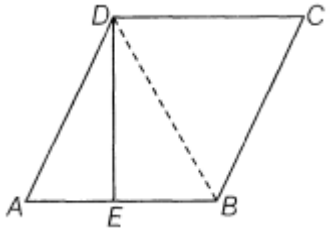
34. $9x^2y^2(3z - 24) \div 27xy(z - 8)$

$= \frac{9x^2y^2(3z-24)}{27xy(z-8)}$

$= \frac{9x^2y^23(z-8)}{27xy(z-8)}$

= xy

35. It is given that ABCD is a rhombus in which DE is the perpendicular bisector of AB.



Join BD. Then, in ΔAED and ΔBED, we have

AE = EB [given]

ED = ED [common side]

$\angle$AED = $\angle$DEB [each = 90°]

$\therefore \Delta AED \cong \Delta BED$ [$\because$ SAS congruence]

$\therefore$ AD = DB = AB [$\because$ ABCD is a rhombus, So, AD = AB]

Thus, ΔADB is an equilateral triangle.

$\therefore \angle DAB = \angle DBA = \angle ADB = 60°$

$\Rightarrow \angle DCB = 60°$ [opposite angles of a rhombus are equal]

Now, $\angle DAB + \angle ABC = 180°$ [adjacent angles of a rhombus are supplementary]

$\Rightarrow 60° + \angle ABD + \angle DBC = 180°$

$\Rightarrow 60° + 60° + \angle DBC = 180°$

$\Rightarrow \angle DBC = 60°$

$\therefore \angle ABC = \angle ABD + \angle DBC = 60° + 60° = 120°$

$\therefore \angle ADC = 120°$ [opposite angles of a rhombus are equal]

Hence, the angles of the rhombus arc 60°, 120°, 60°, 120°

36. i. Probability = $\frac{Number\ of\ favourable\ outcomes}{Total\ number\ of\ possible\ outcomes}$

Number of favourable chances to get a vowel = 5

Total number of possible outcomes = 5

Probability $= \frac{5}{5} = 1$

ii. Probability = $\frac{Number\ of\ favourable\ outcomes}{Total\ number\ of\ possible\ outcomes}$

Number of favourable chance = 1

Probability = $\frac{1}{5}$

iii. Probability = $\frac{Number\ of\ favourable\ outcomes}{Total\ number\ of\ possible\ outcomes}$

Number of favourable chance = 1

Probability = $\frac{1}{5}$

iv. Probability $= \frac{Number\ of\ favourable\ outcomes}{Total\ number\ of\ possible\ outcomes}$

Number of favourable chance = 0

Probability $= \frac{0}{5} = 0$

37. We have,

i. A sunscreen with SPF 15 allows only $\frac{1}{15}$ of the sun's UV rays.

It means = 1 - $\frac{1}{15}$

= $\frac{14}{15}$ of the sun's UV rays abort by sunscreen.

In percentage = $\frac{14}{15} \times 100$

= $\frac{1400}{15}$

= 93.333%

ii. a. Sunscreen allows 25% of the sun's UV rays.

∴ It blocks UV rays = 100 - 25

= 75%

= $\frac{75}{100}$

= $\frac{3}{4}$

b. Sunscreen allows 25% on - of UV rays. It means that it protects = 1 - $\frac{3}{4}$

= $\frac{1}{4}$ of UV rays.

Hence, it's an SPF 4,

iii. False,

According to the claim, for $\frac{3}{100}$ effect of UV rays

1 minute = $33\frac{1}{3}$SPF

Therefore, Affect $\neq$ 30 SPF claim

38. Given

Perimeter of base = 40 cm

So length of side (a) = 40 ÷ 4 = 10 cm

Now, surface area = $6a^2$

= 6×10^2

= $600cm^2$

Volume of cube = a^3

= 10^3

= 1000 cm^3

39. $25a^2 – 4b^2 + 28bc – 49c^2$

= $25a^2 – (4b^2 – 28bc + 49c^2)$

= $25a^2 – \{(2b)^2 – 2(2b)\ (7c) + (7c)^2\}$

= $(5a)^2 – (2b – 7c)^2$. . . . [Using Identity II

= $\{5a – (2b – 7c)\}\ \{5a + (2b – 7c)\}$

= (5a – 2b + 7c) (5a + 2b – 7c)

40. After observing the given graph carefully, it can be concluded that

i. The given statement is false. The older car is B and an older car is more valuable than A

ii. The given statement is true because the speed increases with the size of the car.

iii. The given statement is true because B is the both the larger and an older car.

iv. The given statement is true because B is the both the faster and an older car.

v. The given statement is false because b is more valuable than A. Also, it is faster as compared to A.