

Class VIII Session 2023-24
Subject - Maths
Sample Question Paper - 9

Time Allowed: 3 hours

Maximum Marks: 80

Section A

1. $\frac{-7}{5} + \left(\frac{2}{-11} + \frac{-13}{25} \right) = \left(\frac{-7}{5} + \frac{2}{-11} \right) + \frac{-13}{25}$ [1]

This property is

- | | |
|----------------|----------------|
| a) identity | b) closure |
| c) associative | d) commutative |

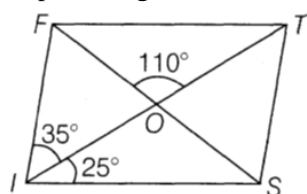
2. Sum of two rational numbers is a _____. [1]

- | | |
|----------------------|--------------------|
| a) positive number | b) negative number |
| c) irrational number | d) rational number |

3. If an angle of a parallelogram is two-third of its adjacent angle, the smallest angle of the parallelogram is [1]

- | | |
|----------------|---------------|
| a) 108° | b) 54° |
| c) 81° | d) 72° |

4. In parallelogram FIST, the value of $\angle OST$ is [1]



- | | |
|---------------|---------------|
| a) 80° | b) 72° |
| c) 75° | d) 70° |

5. Two coins are tossed simultaneously. What is the probability of getting one head and one tail? [1]

- | | |
|------------------|------------------|
| a) $\frac{1}{2}$ | b) $\frac{1}{4}$ |
| c) $\frac{2}{3}$ | d) $\frac{3}{4}$ |

6. The product of two numbers is 1936. If one number is 4 times the other, the numbers are [1]

- | | |
|------------|-----------|
| a) 16, 121 | b) 22, 88 |
| c) 44, 44 | d) 20, 24 |

7. the value of $\sqrt{\frac{0.16}{0.4}}$ is [1]

- | | |
|------------------|---------|
| a) 0.2 | b) 0.63 |
| c) None of these | d) 0.02 |

8. The value of $\left(\sqrt{\frac{225}{729}} - \sqrt{\frac{25}{144}} \right) \div \sqrt{\frac{16}{81}}$ is [1]



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18. Factorise: $169a^2 - 144b^2$ [1]
- a) $(13a + 12b)$

b) $(13a - 12b)$

c) None of these

d) $(13a + 12b)(13a - 12b)$

Section B

19. **Assertion (A):** The edge of the cube whose total surface area is 26.46 sq.m, is 2.1m. [1]
- Reason (R):** The total surface area of cube having side a is $6a^2$.
- 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 (A):** The reciprocal of $(\frac{-1}{3})^{-2}$ is 3^{-2} . [1]
- Reason (R):** A fractional exponent of the form $\frac{1}{n}$ means to take n^{th} root.
- 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. Solve: $0.25(4x - 5) = 0.75x + 8$ [2]
22. Shoes of the following brands are sold in November 2007 at a shoe store. Construct a pie chart for the given data. [2]

Brand	Number of pairs of shoes sold
A	130
B	120
C	90
D	40
E	20

23. Simplify $3x(4x - 5) + 3$ and find its values for [2]
- i. $x = 3$

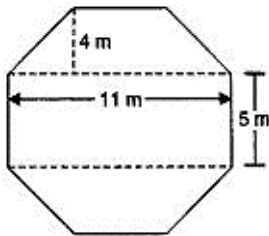
ii. $x = \frac{1}{2}$
24. Express the product of 3.2×10^6 and 4.1×10^{-1} in the standard form. [2]
25. In a camp, there is enough flour for 300 persons for 42 days. How long will the flour last, if 20 more persons join the camp? [2]
26. Factorise the expression and divide it as directed: $(x^4 - 16) \div x^3 + 2x^2 + 4x + 8$. [2]
27. Let a, b, c be the three rational numbers where $a = \frac{2}{3}$, $b = \frac{4}{5}$ and $c = \frac{-5}{6}$ then verify that $a \times (b \times c) = (a \times b) \times c$ (Associative property of multiplication) [3]
28. Solve: $5x - 2(2x - 7) = 2(3x - 1) + \frac{7}{2}$ [3]
29. The rectangle represents the blocks played by children. Based on this answer the following questions: [3]

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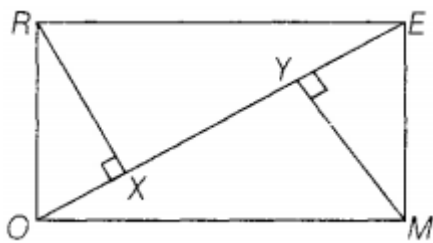
What is the probability that a block drawn at random will be

- a. blue?
- b. yellow?
- c. red?

30. Find a Pythagorean triplet in which one member is 12. [3]
31. Is 53240 a perfect cube? If not, then by which smallest natural number should 53240 be divided so that the quotient is a perfect cube? [3]
32. An article was purchased for ₹1239 including GST of 18%. Find the price of the article before GST was added. [3]
33. Subtract: $3a(a + b + c) - 2b(a - b + c)$ from $4c(-a + b + c)$. [3]
34. Top surface of a raised platform is in the shape of a regular octagon as shown in the figure. Find the area of the octagonal surface. [3]



35. A rectangle MORE is shown below. [4]

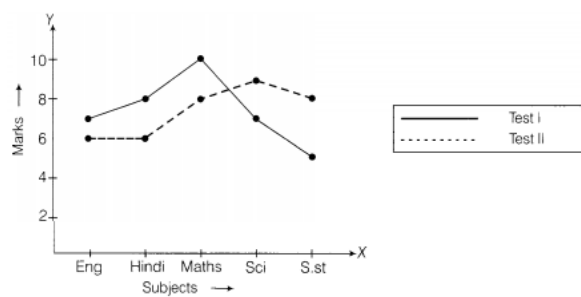


Answer the following questions by giving an appropriate reason.

- i. Is $RE = OM$
 - ii. Is $\angle MYO = \angle RXE$?
 - iii. Is $\angle MOY = \angle REX$?
 - iv. Is $\triangle MYO \cong \triangle RXE$?
 - v. Is $MY = RX$?
36. Given, principal = ₹40000, rate of interest = 8% per annum compounded annually. Find [4]
- i. Interest if period is one year.
 - ii. Principal for 11th year.
 - iii. Interest for 11th year.
 - iv. Amount if period is two year.
37. The radius and height of cylinder are in the ratio of 3:2 and its volume is $19,404 \text{ cm}^3$. Find the radius and height. [4]
38. A photograph of a bacteria enlarged 50000 times attains a length of 5 cm as shown in the diagram. What is the actual length of the bacteria? If the photograph is enlarged 20000 times only, what be its enlarged length? [4]



39. Factorize $36x^2 - 12x + 1 - 25y^2$. [4]
40. The graph given below shows the marks obtained out of 10 by Sonia in two different tests. Study the graph and answer the questions that follow. [4]



- a. What information is represented by the axes?
- b. In which subject did she score the highest in Test I?
- c. In which subject did she score the least in Test II?
- d. In which subject did she score the same marks in both the Tests?
- e. What are the marks scored by her in English in Test II?
- f. In which test was the performance better?
- g. In which subject and which test did she score full marks?

Solution

Section A

1.

(c) associative

Explanation: Since, $a + \{b + c\} = (a + b) + c$ is associative property.

2.

(d) rational number

Explanation: Sum of two rational numbers is a rational number.

For, example, $\frac{2}{3} + \frac{4}{3} = \frac{6}{3}$

3.

(d) 72°

Explanation: Let one angle of a parallelogram be x° Let the other angle of parallelogram be $\frac{2x^\circ}{3}$

Since sum of adjacent angles of a parallelogram is 180°

$$\text{So, } x + \frac{2x^\circ}{3} = 180$$

$$\Rightarrow \frac{5x}{3} = 180^\circ$$

$$\Rightarrow x = 36^\circ \times 3 = 108^\circ$$

The smallest angle of the parallelogram

$$= \frac{2}{3}x = \frac{2}{3} \times 108 = 72^\circ$$

4.

(c) 75°

Explanation: Given, $\angle FIS = 60^\circ$

Now, $\angle FTS = \angle FIS = 60^\circ$ [\because opposite angles of a parallelogram are equal]

Now, $FT \parallel IS$ and TI is a transversal, therefore

$$\angle FTO = \angle SIO = 25^\circ \text{ [alternate angles]}$$

$$\therefore \angle STO = \angle FTS - \angle FTO = 60^\circ - 25^\circ = 35^\circ$$

Also, $\angle FOT + \angle SOT = 180^\circ$ [linear pair]

$$\Rightarrow 110^\circ + \angle SOT = 180^\circ$$

$$\Rightarrow \angle SOT = 180^\circ - 110^\circ = 70^\circ$$

In $\triangle TOS$, $\angle TSO + \angle OTS + \angle TOS = 180^\circ$ [angle sum property of triangle]

$$\therefore \angle OST = 180^\circ - (70^\circ + 35^\circ) = 75^\circ$$

5.

(a) $\frac{1}{2}$

Explanation: Total number of outcomes = $2 \times 2 = 4$

Number of favourable outcomes = 2 [i.e. (H, T), (T, H)]

$$\therefore \text{Probability of getting one head and one tail} = \frac{2}{4} = \frac{1}{2}$$

6.

(b) 22, 88

Explanation: Let one number = a

\therefore Second number = 4a

$$\Rightarrow 4a \times a = 1936$$

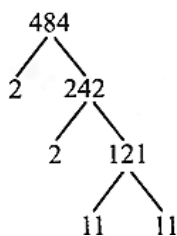
$$\Rightarrow a^2 = \frac{1936}{4} = 484$$

$$\Rightarrow a^2 = 484$$

$$\Rightarrow a^2 = (2 \times 2) \times (11 \times 11)$$

$$\Rightarrow a = 2 \times 11 = 22$$





and $4a = 4 \times 22 = 88$

\therefore Numbers are 22 and 88.

7.

(b) 0.63

Explanation: $\sqrt{\frac{0.16}{0.4}} = \sqrt{\frac{0.16}{0.40}} = \sqrt{\frac{16}{40}}$
 $= \sqrt{\frac{4}{10}} = \sqrt{0.4} = 0.63$

$$\begin{array}{r}
 0.63 \\
 6 \overline{) 0.4000} \\
 \underline{-36} \\
 123 \\
 \underline{-369} \\
 34
 \end{array}$$

8.

(d) $\frac{5}{16}$

Explanation: $\left[\sqrt{\frac{225}{729}} \right] - \left[\sqrt{\frac{25}{144}} \right] \div \sqrt{\frac{16}{81}}$
 $= \left\{ \left[\sqrt{\frac{225}{729}} \right] - \left[\sqrt{\frac{25}{144}} \right] \right\} \div \frac{4}{9} = \left[\frac{15}{27} - \frac{5}{12} \right] \div \frac{4}{9}$
 $= \left[\frac{5}{9} - \frac{5}{12} \right] \div \frac{4}{9} = \left[\frac{20-15}{36} \right] \div \frac{4}{9}$
 $= \frac{5}{36} \div \frac{4}{9} = \frac{5}{36} \times \frac{9}{4} = \frac{5}{16}$

9.

(d) 2

Explanation: $864 \times n$ is a perfect cube.

$$864 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3$$

$$= n = 2$$

$$\begin{array}{r}
 2 \overline{) 864} \\
 2 \overline{) 432} \\
 2 \overline{) 216} \\
 2 \overline{) 108} \\
 2 \overline{) 54} \\
 3 \overline{) 27} \\
 3 \overline{) 9} \\
 3
 \end{array}$$

10. (a) $2^3 \times 2^3 \times 3^3$

Explanation: $1728 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3$

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

11.

(d) Rs 17,250

Explanation: Price of the Washing Machine = Rs.15,000

$$\text{Sale tax} = ₹ \frac{15000 \times 15}{100}$$

$$= \text{Rs } 2,250$$

Amount Arjun will have to pay = Rs (15,000 + 2,250)

$$= \text{Rs.17,250}$$

12.

(d) $3x^2 + 18x - 13$

Explanation: $-3x(7x-4) + 6x - (13 - 24x^2)$

$$= -21x^2 + 12x + 6x - 13 + 24x^2$$

$$= 3x^2 + 18x - 13$$

13.

(d) $\frac{x^2-1}{x}$

Explanation: Let y should be added to $\frac{1}{x}$ to make it equal to x

$$\Rightarrow \frac{1}{x} + y = x$$

$$y = x - \frac{1}{x}$$

$$= \frac{x^2-1}{x}$$

14.

(b) 2420 in.^2

Explanation: radius of cylindrical bar = 5 in. and height = 72 in.

The surface area of the cylindrical bar = $2\pi r(r + h)$

$$S = 2 \times \frac{22}{7} \times 5(5 + 72)$$

$$S = \frac{22}{7} (77)$$

$$S = \frac{22}{7} \times 77$$

$$S = \frac{16940}{7} = 2420 \text{ in.}^2$$

the surface area of cylindrical bar = 2420 in.^2

15.

(b) 12 cm^2

Explanation: Given that, Base of the triangle = 4 cm

The altitude of the triangle = 6cm

Area of a triangle = $\frac{1}{2} \times \text{base} \times \text{altitude}$

$$\text{So, Area of the given triangle} = \left(\frac{1}{2}\right) \times 4 \times 6 = 12 \text{ cm}^2$$

16.

(b) $1 \times 10^3 + 0 \times 10^2 + 2 \times 10^1 + 5 \times 10^0 + 6 \times 10^{-1} + 3 \times 10^{-2}$

Explanation: Rule of expanding for thousands, hundreds, tens, units and tenth, hundredth then multiply each digit with the exponential for of its place value & add them together.

17. (a) 25

Explanation: Let company makes x blue cars for 15 white cars

Blue Cars	5	x
White Cars	3	15

$$\Rightarrow \frac{5}{3} = \frac{x}{15}$$

$$\Rightarrow \frac{5 \times 15}{3} = x$$

$$x = 25$$

18.

(d) $(13a + 12b)(13a - 12b)$

Explanation: $169a^2 - 144b^2$

$$(13a)^2 - (12b)^2$$

$$(13a + 12b)(13a - 12b)$$

Section B

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

Explanation: Reason explain the assertion point.

20.

(d) A is false but R is true.

Explanation: Its answer is 3^2 .



Section C

21. Given, $0.25(4x - 5) = 0.75x + 8$

$$\Rightarrow x - 1.25 = 0.75x + 8$$

$$\Rightarrow x - 0.75x = 1.25 + 8 \text{ [transposing } 0.75x \text{ to LHS and } 1.25 \text{ to RHS]}$$

$$\Rightarrow 0.25x = 9.25$$

$$\Rightarrow \frac{0.25x}{0.25} = \frac{9.25}{0.25} \text{ [dividing both sides by } 0.25]$$

$$\therefore x = 37$$

22. Total number of pairs of shoes sold = $(130 + 120 + 90 + 40 + 20) = 400$

\therefore Central angle of pie chart representing the brands:

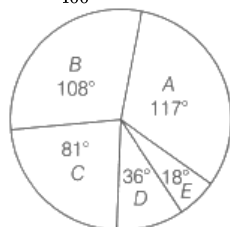
i. $A = \frac{130}{400} \times 360^\circ = 117^\circ$ (as total central angle = 360°)

ii. $B = \frac{120}{400} \times 360^\circ = 108^\circ$

iii. $C = \frac{90}{400} \times 360^\circ = 81^\circ$

iv. $D = \frac{40}{400} \times 360^\circ = 36^\circ$

v. $E = \frac{20}{400} \times 360^\circ = 18^\circ$



23. We have $3x(4x - 5) + 3$

simplification: $3x(4x - 5) + 3 = 3x(4x) - 3x(5) + 3 = 12x^2 - 15x + 3$

i. $x = 3$

Putting $x = 3$ in above equation, we get $12(3)^2 - 15(3) + 3$

$$= 12(9) - 45 + 3$$

$$= 108 - 42 = 66$$

ii. $x = \frac{1}{2}$

Putting $x = \frac{1}{2}$ in above equation, we get

$$12\left(\frac{1}{2}\right)^2 - 15\left(\frac{1}{2}\right) + 3$$

$$= 12 \times \frac{1}{4} - \frac{15}{2} + 3$$

$$= 3 - \frac{15}{2} + 3$$

$$= 6 - \frac{15}{2}$$

$$= \frac{12-15}{2}$$

$$= \frac{-3}{2}$$

24. Product of 3.2×10^6 and $4.1 \times 10^{-1} = (3.2 \times 10^6)(4.1 \times 10^{-1})$

$$= (3.2 \times 4.1) \times 10^6 \times 10^{-1}$$

$$= 13.12 \times 10^5 = 1.312 \times 10^5 \times 10^1 [\because a^m \times a^n = a^{m+n}]$$

$$= 1.312 \times 10^6$$

25. \therefore For 300 persons flour is enough for 42 days.

\therefore For 1 person flour will be enough for = $300 \times 42 = 12600$ days

Now, 20 more persons join the camp.

So, total persons = $300 + 20 = 320$

\therefore For 320 persons flour enough = $\frac{12600}{320} = \frac{315}{8} = 39\frac{3}{8}$ days

26. We have, $(x^4 - 16) \div x^3 + 2x^2 + 4x + 8$

$$(x^4 - 16) \div x^3 + 2x^2 + 4x + 8 = \frac{x^4 - 16}{x^3 + 2x^2 + 4x + 8}$$

$$= \frac{(x^2)^2 - 4^2}{x^2(x+2) + 4(x+2)} [\because a^2 - b^2 = (a+b)(a-b)]$$

$$= \frac{(x^2 + 4)(x^2 - 4)}{(x^2 + 4)(x + 2)} = \frac{x^2 - 4}{x + 2}$$

$$= \frac{(x+2)(x-2)}{x+2} \text{ again } [\because a^2 - b^2 = (a+b)(a-b)]$$

$$= x - 2$$

27. Taking L.H.S = $a \times (b \times c)$

$$= \frac{2}{3} \times \left[\frac{4}{5} \times \left(\frac{-5}{6} \right) \right]$$

$$= \frac{2}{3} \times \left(\frac{-20}{30} \right)$$

$$= \frac{2}{3} \times \left(\frac{-2}{3} \right)$$

$$= \frac{2 \times (-2)}{3 \times 3}$$

$$= \frac{-4}{9}$$

Taking R.H.S. = $(a \times b) \times c$

$$= \left(\frac{2}{3} \times \frac{4}{5} \right) \times \frac{-5}{6}$$

$$= \frac{8}{15} \times \left(\frac{-5}{6} \right)$$

$$= \frac{-40}{90}$$

$$= \frac{-4}{9}$$

$$\text{So, } \frac{2}{3} \times \left[\frac{4}{5} \times \left(\frac{-5}{6} \right) \right] = \left[\frac{2}{3} \times \frac{4}{5} \right] \times \left(\frac{-5}{6} \right)$$

28. $5x - 2(2x - 7) = 2(3x - 1) + \frac{7}{2}$

$$5x - 4x + 14 = 6x - 2 + \frac{7}{2}$$

$$x + 14 = 6x + \frac{3}{2}$$

$$6x - x = 14 - \frac{3}{2}$$

$$5x = \frac{25}{2}$$

$$x = \frac{25}{2} \times \frac{1}{5} = \frac{5}{2}$$

Therefore, the required solution is $x = \frac{5}{2}$.

29. a. *Probability* = $\frac{\text{Number of favourable outcomes}}{\text{Total number of possible outcomes}}$

Number of favorable chance to get blue = 3

Total no. of outcomes = 16

$$\text{Probability} = \frac{3}{16} = 3/16$$

b. *Probability* = $\frac{\text{Number of favourable outcomes}}{\text{Total number of possible outcomes}}$

Number of favorable chance to get yellow = 1

$$\text{Probability} = \frac{1}{16} = 1/16$$

c. *Probability* = $\frac{\text{Number of favourable outcomes}}{\text{Total number of possible outcomes}}$

Number of favorable chance to get red = 8

$$\text{Probability} = \frac{8}{16} = \frac{1}{2}$$

30. If we take $m^2 - 1 = 12$

$$\text{Then, } m^2 = 12 + 1 = 13$$

Then the value of m will not be an integer.

So, we try to take $m^2 + 1 = 12$. Again $m^2 = 11$ will not give an integer value for m.

So, let us take $2m = 12$

$$\text{then } m = 6$$

$$\text{Thus, } m^2 - 1 = 36 - 1 = 35 \text{ and } m^2 + 1 = 36 + 1 = 37$$

Therefore, the required triplet is 12, 35, 37.

31. $53240 = \underline{2} \times \underline{2} \times \underline{2} \times \underline{11} \times \underline{11} \times \underline{11} \times 5$

The prime factor 5 does not appear in a group of three. So, 53240 is not a perfect cube. In the factorisation 5 appears only one time. If we divide the number by 5, then the prime factorisation of the quotient will not contain 5.

$$\text{So, } 53240 \div 5 = \underline{2} \times \underline{2} \times \underline{2} \times \underline{11} \times \underline{11} \times \underline{11}$$

Hence the smallest number by which 53240 should be divided to make it a perfect cube is 5.

The perfect cube in that case is = 10648.

32. Given,

$$\text{GST} = 18\%$$

Cost with GST included = ₹ 1239

Let cost without GST = x

So, Cost before GST + GST = Cost with GST

$$x + \left(\frac{18}{100} \times x\right) = 1239$$

$$x + \left(\frac{9x}{50}\right) = 1239$$

$$x = 1050$$

Thus, price before GST = 1050 rupees

$$33. 4c(-a + b + c) - [3a(a + b + c) - 2b(a - b + c)]$$

$$= -4ac + 4bc + 4c^2 - [3a^2 + 3ab + 3ac - 2ab + 2b^2 - 2bc]$$

$$= -4ac + 4bc + 4c^2 - [3a^2 + 2b^2 + 3ab - 2bc + 3ac - 2ab]$$

$$= -4ac + 4bc + 4c^2 - [3a^2 + 2b^2 + ab + 3ac - 2bc]$$

$$= -4ac + 4bc + 4c^2 - 3a^2 - 2b^2 - ab - 3ac + 2bc$$

$$= -3a^2 - 2b^2 + 4c^2 - ab + 4bc + 2bc - 4ac - 3ac$$

$$= -3a^2 - 2b^2 + 4c^2 - ab + 6bc - 7ac$$

$$34. \text{Area of the octagonal surface}$$

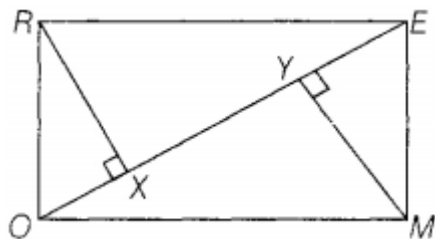
$$= \text{Area of rectangular portion} + 2(\text{Area of trapezoidal portion})$$

$$= 11 \times 5 + 2 \times \left[\frac{(5+11) \times 4}{2} \right] m^2$$

$$= 55 + 64 m^2$$

$$= 119 m^2.$$

$$35. \text{A rectangle MORE is shown below:}$$



$$i. \text{ Yes, } RE = OM$$

Given, MORE is a rectangle. Therefore, the opposite sides are equal.

$$ii. \text{ Yes, } \angle MYO = \angle RXE$$

Here, MY and RX are perpendicular to OE.

$$\text{Since, } \angle RXO = 90^\circ \Rightarrow \angle RXE = 90^\circ \text{ and } \angle MYE = 90^\circ \Rightarrow \angle MYO = 90^\circ$$

$$iii. \text{ Yes, } \angle MOY = \angle REX$$

$\therefore RE \parallel OM$ and EO is a transversal.

$$\therefore \angle MOE = \angle OER \text{ [alternate interior angles]}$$

$$\Rightarrow \angle MOY = \angle REX$$

$$iv. \text{ Yes, } \triangle MYO \cong \triangle RXE$$

In $\triangle MYO$ and $\triangle RXE$

$$MO = RE \text{ [proved in (i)]}$$

$$\angle MOY = \angle REX \text{ [proved in (iii)]}$$

$$\angle MYO = \angle RXE \text{ [proved in (ii)]}$$

$$\therefore \triangle MYO \cong \triangle RXE \text{ [by AAS]}$$

$$v. \text{ Yes, } MY = RX$$

Since, these are corresponding parts of congruent triangles.

$$36. \text{ We have given that principal (P)= ₹40000}$$

$$\text{Rate of interest (R) = 8\% per annum}$$

$$i. \text{ Compound interest for one year,}$$

$$\text{We know that, } A = P \left(1 + \frac{R}{100} \right)^n$$

$$= 40000 \left(1 + \frac{8}{100} \right)^1 \text{ [} \because n = 1 \text{ yr]}$$

$$= 40000 \times \frac{108}{100}$$

$$\therefore \text{Amount, } A = 400 \times 108$$

$$= ₹43200$$

$$\therefore \text{Compound interest, CI} = A - P$$

$$= ₹43200 - ₹40000$$

$$= ₹3200$$

ii. Amount of 1st year = Principal of 1st year

$$= ₹43200$$

iii. Now, for 1st year,

$$\text{Principal} = ₹43200$$

$$\text{Rate of interest, } R = 8\% \text{ per annum}$$

$$\text{Time, } n = 1 \text{ yr}$$

$$\text{Amount for 1st year} = 43200$$

$$= \left(1 + \frac{8}{100}\right)^1$$

$$= 43200 \times \frac{108}{100}$$

$$= ₹46656$$

$$\text{Compound interest, CI} = A - P$$

$$= ₹46656 - ₹43200$$

$$= ₹3456$$

iv. Now, if period i.e. time (n) = 2 yr,

$$\text{Principal} = ₹40000$$

$$\text{and rate (R)} = 8\% \text{ per annum}$$

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

$$\Rightarrow A = 40000 \left(1 + \frac{8}{100}\right)^2$$

$$= 40000 \times \frac{108}{100} \times \frac{108}{100}$$

$$= ₹46656$$

$$\text{Therefore the total Amount, } A = ₹46656$$

37. Let the radius be 3x and height be 2x.

$$\text{Volume of cylinder} = \pi r^2 h$$

$$19404 = \frac{22}{7} (3x)(3x)(2x)$$

$$19404 = \frac{(66x)(6x^2)}{7}$$

$$19404 \times 7 = 396x^3$$

$$x^3 = 343$$

$$x = \sqrt[3]{343}$$

$$x = 7\text{cm}$$

Therefore,

$$\text{Radius} = 3x = 3(7) = 21\text{cm}$$

$$\text{Height} = 2x = 2(7) = 14\text{cm}$$

38. Actual length of the bacteria

$$\frac{5}{50000} \text{ cm}$$

$$= \frac{1}{10000} \text{ cm.}$$

$$= 10^{-4} \text{ cm}$$

More the number of times a photograph of a bacteria is enlarged, more the length attained. So, the number of times a photograph of a bacteria is enlarged and the length attained are directly proportional to each other.

$$\text{So, } \frac{x_1}{x_2} = \frac{y_1}{y_2}$$

$$\therefore \frac{50000}{5} = \frac{20000}{y_2}$$

$$\therefore 50000 y_2 = 5 \times 20000$$

$$\therefore y_2 = \frac{5 \times 20000}{50000}$$

$$\therefore y_2 = 2$$

Hence, its enlarged length would be 2 cm.

$$39. 36x^2 - 12x + 1 - 25y^2 = (6x)^2 - 2 \times 6x \times 1 + 1^2 - (5y)^2$$

$$= (6x - 1)^2 - (5y)^2 \text{ Use } a^2 - b^2 = (a + b)(a - b)$$

$$= \{(6x - 1) - 5y\} \{(6x - 1) + 5y\}$$

$$= (6x - 1 - 5y)(6x - 1 + 5y)$$

$$\therefore 36x^2 - 12x + 1 - 25y^2 = (6x - 5y - 1)(6x + 5y - 1)$$

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

- The x-axis represents subjects and the y-axis represents the marks obtained by Sonia.
- In Maths, she scored the highest in Test I.
- In English and Hindi, she scored the least in Test II.
- In Hindi and Maths, she scored the same marks in both tests.
- She scored 6 marks in English in Test II.
- Same performance in both tests by Sonia.
- Test I in Maths, she scored full marks i.e. 10 marks.