

PRACTICE PAPER - 2

Number of Questions: 50

1. In a $\triangle ABC$, $\angle A = 90^\circ$, $\angle C = 55^\circ$ and $\overline{AD} \perp \overline{BC}$. What is the value of $\angle BAD$?

(a) 60°
(b) 45°
(c) 55°
(d) 35°

2. The ratio of the number of boys and girls in a government aided school is 3:2. 20% of the boys and 25% of the girls are not scholarship holders. The percentage of students who are scholarship holders is?

(a) 70%
(b) 48%
(c) 60%
(d) 78%

3. The side of a square increases by 10%, then find, by what per cent, does its area increase?

(a) 27
(b) 30
(c) 19
(d) 21

4. Simplify $\frac{\frac{1}{3} + \frac{1}{4} \left[\frac{2}{5} - \frac{1}{2} \right]}{1\frac{2}{3} \text{ of } \frac{3}{4} - \frac{3}{4} \text{ of } \frac{4}{5}}$

- (a) $\frac{37}{78}$
- (b) $\frac{37}{13}$
- (c) $\frac{74}{78}$
- (d) $\frac{74}{13}$

5. Ram went to a market and bought one copy of a Mathematics book and two pencils for ₹ 165. Rahim went to the same market and bought another copy of the same book and ten pencils of the same brand for ₹169. The price of each pencil was
- (a) ₹ 0.50
 - (b) ₹ 1
 - (c) ₹ 0.75
 - (d) ₹ 2
6. Each member of picnic party contributed twice as many rupees as the total number of members and the total collection was ₹ 3042. The number of members present in the party was
- (a) 2
 - (b) 32
 - (c) 40
 - (d) 39
7. If cube root of 175616 is 56 , then the value of $\sqrt[3]{175.616} + \sqrt[3]{0.175616} + \sqrt[3]{0.000175616}$ is equal to
- (a) 0.168
 - (b) 62.16
 - (c) 6.216
 - (d) 6.116
8. Several litres of acid were drawn off a 54 L vessel full of acid and an equal amount of water added. Again the same volume of the mixture was drawn off and replaced by water. As a result, the vessel contained 24 L of pure acid. How much of the acid was draw off initially?
- (a) 12 L
 - (b) 16 L
 - (c) 18 L
 - (d) 24 L

9. A shopkeeper purchases 10 pieces of certain items for ₹ 8.00 and sells them at 8 pieces for ₹ 10.00. The profit percentage of the shopkeeper is

- (a) 56.50
- (b) 56.25
- (c) 25.50
- (d) 26.25

10. The marked price is 10% higher than the cost price. A discount of 10% is given on the marked price. In this kind of sale, the seller

- (a) losses 1.5%
- (b) bears no loss, makes no gain
- (c) gains 1%
- (d) losses 1%

11. If $\frac{3x+6}{8} - \frac{11x-8}{24} + \frac{x}{3} = \frac{3x}{4} - \frac{x+7}{24}$, then the value of x is

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

12. The value of y in the solution of the equation $2^{x+y} = 2^{x-y} = \sqrt{8}$ is

- (a) 0
- (c) $\frac{1}{2}$
- (b) $\frac{1}{4}$
- (d) $\frac{3}{7}$

13. The diameters of two concentric circles are 8 cm and 10 cm. The area of the region between them is

- (a) 2π sqcm
- (b) 4π sqcm
- (c) 36π sqcm
- (d) 9π sqcm

14. The diagonal of square field is 50 m. The area (in m^2) of the field is

- (a) 625
- (b) 1250
- (c) 2500
- (d) 5000

15. If $\frac{1}{5} : \frac{1}{x} = \frac{1}{x} : \frac{1}{1.25}$, then the value of x is

- (a) 1.5
- (b) 2
- (c) 2.5
- (d) 3.5

16. If the length of longest rod that can be placed within the cuboid is $5\sqrt{5}$ m long and the sum of length breadth and height is 19 m long, then find the whole surface area of that cuboid.

- (a) 236 m^2
- (c) 125 m^2
- (b) 256 m^2
- (d) 361 m^2

17. If $a : b = c : d$, then $\frac{ma+nc}{mb+nd}$ is equal to

- (a) $m : n$
- (b) $na : mb$
- (c) $a : b$
- (d) $md : nc$

18. 15 trackmen complete rail renewal job in 12 days. How many days would 18 trackmen take to complete the same job?

- (a) 10
- (b) 18
- (c) 15
- (d) 17

19. A man can do a work in 15 days. His father does this work in 20 days and man's son do this work in 25 days. If all do the work together, how many days will they take?

- (a) Less than 6 days
- (b) 6 days
- (c) Approximately 6.4 days
- (d) More than 10 days

20. The average of five numbers is 42 while the average of another eight numbers is 81. What is the combined average of all numbers together?

- (a) 66
- (b) 60.5
- (c) 68.5
- (d) 64

21. The average of first five multiple of 3 is

- (a) 3
- (b) 9
- (c) 12
- (d) 15

22. The LCM of $(16 - x^2)$ and $(x^2 + x - 6)$ is

- (a) $(x - 3)(x + 3)(4 - x^2)$
- (b) $4(4 - x^2)(x + 3)$
- (c) $(4 - x^2)(x - 3)$
- (d) $(16 - x^2)(x - 2)(x + 3)$

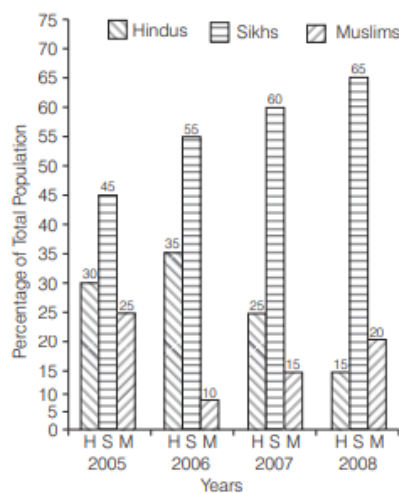
23. If a man runs at 2 m/s, how many kilometres does he run in 1 h20 min?

- (a) 8.4
- (b) 6.9
- (c) 9.6
- (d) 7.4

24. Nalanda and Nawada are two towns. Sabir goes from Nalanda to Nawada at 30 km/h and comes back to the starting point at 70 km/h. What is the average speed during the whole journey?

- (a) 12 km/h
- (b) 60 km/h
- (c) 24 km/h
- (d) 42 km/h

Directions (Q. Nos. 25 -28) The following diagram shows the percentage of population of Hindus, Sikhs and Muslims with respect to total population in a town during 2005 to 2008. Study the diagrams and answer the question.



25. If the total population in 2007 was 80 lakhs, then the number of Hindus in 2007 was (in lakh)

- (a) 25
- (b) 16
- (c) 18
- (d) 20

26. Percentage decrease in Hindu population from 2005 to 2008 is

- (a) 50
- (b) 40
- (c) 25
- (d) 15

27. Difference of percentage of population of Hindus in 2005 and 2008 is

- (a) 20
- (b) 15
- (c) 25
- (d) 30

28. If the total number of Hindus in 2008 was 12 lakhs, the number of Muslims in 2008 was (in lakh)

- (a) 28
- (b) 12
- (c) 24
- (d) 16

29. Three cubes of iron of edges 9 cm, 12 cm and 15 cm respectively are melted to form a large single cube. The edge of the new cube is

- (a) 10 cm
- (b) 14 cm
- (c) 18 cm
- (d) 16 cm

30. Three cubes of iron of edges 9 cm, 12 cm and 15 cm respectively are melted to form a large single cube. The edge of the new cube is

- (a) 10 cm
- (b) 14 cm
- (c) 18 cm
- (d) 16 cm

31. A number consists of two digits. If the digits interchange places and the new number is added to the original number, the resulting number will be divisible by

- (a) 11
- (b) 5
- (c) 3
- (d) 9

32. An 85 m long rod is divided into two parts. If one part is $\frac{2}{3}$ of the other part, then the longer part (in m) is

- (a) 34
- (b) $56\frac{2}{3}$
- (c) 85
- (d) 51

33. The unit's place digit in the product $(3127)^{173}$ will be

- (a) 1
- (b) 3
- (c) 7
- (d) 9

34. If a number is decreased by 4 and divided by 6 the result is 8. What would be the result if 2 is subtracted from the number and then it is divided by 5?

- (a) $9\frac{2}{3}$
- (b) $10\frac{1}{5}$
- (c) $11\frac{2}{5}$
- (d) 10

35. 0.008 is what per cent of 0.2?

- (a) 0.4
- (b) 2
- (c) 40
- (d) 4

36. If $x\%$ of $\frac{25}{2}$ is 150, then the value of x is

- (a) 1000
- (b) 1200
- (c) 1400
- (d) 1500

37. Each student of class 10 contributed some money for a picnic. The money contributed by each student was equal to the cube of the total number of students. If the total collected amount was ₹ 29791, find the total number of students.

- (a) 15
- (b) 27
- (c) 31
- (d) 34

38. $17^{3.5} \times 17^{7.3} \div 17^{4.2} = 17^2$, then find the value of (?).

- (a) 6.5
- (b) 7.2
- (c) 6.6
- (d) 15.8

39. The solution of the system of linear equations $0.4x + 0.3y = 1.7$ and $0.7x - 0.2y = 0.8$ is

- (a) $x = 3, y = 2$
- (b) $x = 2, y = -3$
- (c) $x = 2, y = 3$
- (d) None of these

40. A motor boat takes 2 h to travel a distance of 9 km down the current and it takes 6 h to travel the same distance against the current. The speed of the boat in still water and that of the current (in km/h) respectively are

- (a) 3,2
- (b) 3.5,2.5
- (c) 3,1.5
- (d) 3,1

41. Distance between two towns P and Q is 240 km. A motor cycle rider starts from P towards Q at 8pm at a speed of 40 km/h. At the same time another motor cycle rider starts from Q towards P at 50 km/h. At what time will they meet?

- (a) 9: 45pm
- (b) 10: 40pm
- (c) 11pm
- (d) 10: 30pm

42. The value of $\frac{3 \cdot 9^{n+1} + 9 \cdot 3^{2n-1}}{9 \cdot 3^{2n} - 6 \cdot 9^{n-1}}$ is

- (a) $3\frac{3}{5}$
- (b) $3\frac{2}{5}$
- (c) $3n + 1$
- (d) $3n - 16$

43. Each student of class 10 contributed some money for a picnic. The money contributed by each student was equal to the cube of the total number of students. If the total collected amount was ₹ 29791, find the total number of students.

- (a) 15
- (b) 27
- (c) 31
- (d) 34

44. An angle is 10° more than one-third of its complement. Find the greater angle.

- (a) 30°
- (b) 60°
- (c) 45°
- (d) 75°

45. If the distance between the points $(x, 0)$ and $(-7, 0)$ is 10 units, then the possible values of x are

- (a) 3 and 17
- (b) -3 and 17
- (c) 3 and -17
- (d) -3 and -17

46. There are three containers of equal capacity. The ratio of sulphuric acid to water in the first container is 3: 2, that in the second container is 7: 3 and in the third container 11:4. If all the liquids are mixed together, then the ratio of sulphuric acid to water in the mixture will be

- (a) 61: 29
- (b) 61: 28
- (c) 60: 29
- (d) 59: 29

47. The average of 50 numbers is 38. If two numbers namely 45 and 55 are discarded, the average of remaining numbers is

- (a) 36.5
- (b) 37
- (c) 37.5
- (d) 37.52

48. If 6 men and 8 boys can do a piece of work in 10 days, while 26 men and 48 boys can do the same in 2 days, the time taken by 15 men and 20 boys in doing the same type of work will be

- (a) 4 days
- (b) 5 days
- (c) 6 days
- (d) 7 days

49. A can do a work in 15 days and B in 20 days. If they work on it together for 4 days, then the fraction of the work that is left is

- (a) $\frac{1}{4}$
- (b) $\frac{1}{10}$
- (c) $\frac{7}{15}$
- (d) $\frac{8}{15}$

50. $\sqrt{0.04} = ?$

- (a) 0.002
- (b) 0.02
- (c) 0.2
- (d) None of these

ANSWERS

1.	(c)	2.	(d)	3.	(d)	4.	(a)	5.	(a)	6.	(d)	7.	(c)	8.	(c)	9.	(b)	10.	(d)
11.	(c)	12.	(a)	13.	(a)	14.	(b)	15.	(c)	16.	(b)	17.	(c)	18.	(d)	19.	(a)	20.	(a)
21.	(b)	22.	(d)	23.	(c)	24.	(d)	25.	(d)	26.	(a)	27.	(b)	28.	(d)	29.	(b)	30.	(c)
31.	(a)	32.	(d)	33.	(c)	34.	(d)	35.	(d)	36.	(b)	37.	(c)	38.	(c)	39.	(c)	40.	(c)
41.	(b)	42.	(a)	43.	(c)	44.	(b)	45.	(c)	46.	(a)	47.	(c)	48.	(a)	49.	(d)	50.	(c)

Hints & Solutions:

1. In a right-angled triangle $\triangle ABC$ with $\angle A = 90^\circ$ and $\angle C = 55^\circ$, and with $(AD)^\perp$ being perpendicular to $(BC)^\perp$, we can use the fact that in a right triangle, the sum of the two acute angles is always 90° .

$$\text{So, } \angle B + \angle C = 90^\circ.$$

Given that $\angle C = 55^\circ$, we can find $\angle B$:

$$\angle B + 55^\circ = 90^\circ \quad \angle B = 90^\circ - 55^\circ \quad \angle B = 35^\circ$$

Now, since $(AD)^\perp \perp (BC)^\perp$, $\angle BAD$ is complementary to $\angle B$. Therefore,

$$\angle BAD = 90^\circ - \angle B \quad \angle BAD = 90^\circ - 35^\circ \quad \angle BAD = 55^\circ$$

2. Let number of boys and girls in the school be $3x$ and $2x$, respectively making $5x$ as the total number of students.

Now, number of students who are scholarship holders

$$= 80\% \text{ of } 3x + 75\% \text{ of } 2x$$

$$= 2.4x + 1.5x = 3.9x$$

Therefore, required percentage

$$\begin{aligned} &= \frac{3.9x}{5x} \times 100\% \\ &= 78\% \end{aligned}$$

3. Required percentage increment = $\left(2x + \frac{x^2}{100}\right) = \left(2 \times 10 + \frac{(10)^2}{100}\right) = 20 + 1 = 21\%$

$$\begin{aligned} 4. & \frac{\frac{1}{3} + \frac{1}{4} \left[\frac{2}{5} - \frac{1}{2} \right]}{1\frac{2}{3} \text{ of } \frac{3}{4} - \frac{3}{4} \text{ of } \frac{4}{5}} \\ &= \frac{\frac{1}{3} + \frac{1}{4} \left[\frac{4-5}{10} \right]}{\frac{3}{4} \times \frac{3}{4} - \frac{3}{5} \times \frac{3}{4}} \\ &= \frac{\frac{1}{3} + \frac{1}{4} \left[-\frac{1}{10} \right]}{\frac{5}{4} - \frac{3}{5}} \end{aligned}$$

$$= \frac{\frac{1}{3} - \frac{1}{40}}{\frac{13}{20}} = \frac{37}{120} \times \frac{20}{13} = \frac{37}{78}$$

5. According to the question,

$$\text{Cost price of } \rightarrow (1 \text{ book} + 2 \text{ pencils}) = ₹165$$

$$\text{Cost price of } \rightarrow (1 \text{ book} + 10 \text{ pencils}) = ₹169 \dots\dots(\text{ii})$$

On subtracting Eq. (i) from Eq.

$$\text{(ii) we get, } 8 \text{ pencils} = ₹4$$

$$\therefore 1 \text{ pencil} = ₹\frac{4}{8} = ₹0.50$$

6. Let the number of members = x According to question,

$$\begin{aligned} 2x^2 &= 3042 \\ \Rightarrow x^2 &= 1521 \\ \Rightarrow x &= \sqrt{39 \times 39} = 39 \end{aligned}$$

7. $\therefore \sqrt[3]{175616} = 56$

Now,

$$\begin{aligned} &\sqrt[3]{175.616} + \sqrt[3]{0.175616} \\ &\quad + \sqrt[3]{0.000175616} \\ &= \sqrt[3]{\frac{175616}{1000}} + \sqrt[3]{\frac{175616}{1000000}} \\ &\quad + \sqrt[3]{\frac{175616}{1000000000}} \\ &= \frac{56}{10} + \frac{56}{100} + \frac{56}{1000} \\ &= 5.6 + 0.56 + 0.056 = 6.216 \end{aligned}$$

8. Let x L of several litres of acid were drawn off initially

$$\therefore \text{Remaining acid in the vessel} = (54 - x)L$$

$$\text{and quantity of water in the vessel} = x L$$

Now, x L of mixture is drawn off

$$\therefore \text{Quantity of acid drawn off} = \left(\frac{54-x}{54} \times x\right) L$$

$$\text{and quantity of water drawn off} = \frac{x^2}{54} L$$

$$\text{Now, the quantity of acid} = \left[54 - x - \left(\frac{54-x}{54}\right)x\right] L$$

$$\therefore 54 - x - \frac{(54-x)}{54}x = 24$$

$$\Rightarrow x^2 - 108x + 1620 = 0$$

$$\Rightarrow x = 90, 18$$

$$\therefore 90 > 54$$

So, $x = 90$ is ruled out

Hence, $x = 18$

9. Selling price of 1 price of article = $\frac{10}{8} = ₹1.25$

$$\text{Profit while selling on a price of article} = 1.25 - 0.8 = ₹0.45$$

\therefore Required gain percentage

$$\begin{aligned} &= \frac{0.45 \times 100}{0.8} \\ &= 56.25\% \end{aligned}$$

10. Here, $x = 10, y = 10$

\therefore Resultant gain or loss

$$\begin{aligned} &= \left(x - y - \frac{xy}{100}\right)\% \\ &= \left(10 - 10 - \frac{10 \times 10}{100}\right)\% \\ &= -1\% \end{aligned}$$

Thus, seller losses 1%.

11. Given that,

$$\begin{aligned}\frac{3x+6}{8} - \frac{11x-8}{24} + \frac{x}{3} &= \frac{3x}{4} - \frac{x+7}{24} \\ \therefore \frac{9x+18-11x+8+8x}{24} &= \frac{18x-x-7}{24} \\ \Rightarrow 6x+26 &= 17x-7 \\ \Rightarrow 11x &= 33 \Rightarrow x=3\end{aligned}$$

12. Since, $2^{x+y} = \sqrt{8}$ and $2^{x-y} = \sqrt{8}$

$$\Rightarrow x+y = \frac{3}{2}$$

$$\text{and } x-y = \frac{3}{2}$$

$$\Rightarrow 2x+2y = 3$$

$$\text{and } 2x-2y = 3$$

On solving, we get $x = \frac{3}{2}, y = 0$

13. The area of the region between two concentric circles

$$\begin{aligned}&= \pi(R^2 - r^2) = \pi(5^2 - 4^2) \\ &= \pi(25 - 16) = 9\pi \text{ cm}^2\end{aligned}$$

14. Area of the square field

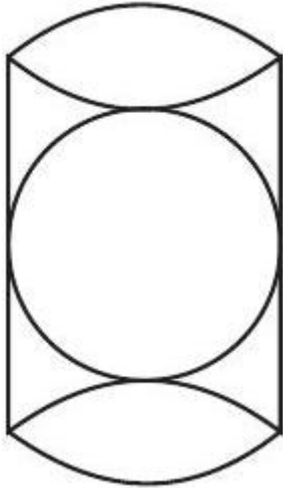
$$\begin{aligned}&= \frac{1}{2} (\text{Diagonal})^2 \\ &= \frac{1}{2} (50)^2 \\ &= 1250 \text{ sqm}\end{aligned}$$

$$15. \frac{1}{5} \times \frac{1}{1.25} = \frac{1}{x^2}$$

$$\Rightarrow x^2 = 5 \times 1.25$$

$$x = \sqrt{6.25} = 2.5$$

16. Radius of the sphere = Radius of the base of the cylinder and height of the cylinder = Diameter of the sphere = $2r$ Volume of sphere = $\frac{4}{3}\pi r^3$



and volume of the cylinder = $\pi r^2(2r) = 2\pi r^3$

\therefore Volume of the empty space

$$= 2\pi r^3 - \frac{4}{3}\pi r^3$$

$$= \frac{2}{3}\pi r^3$$

$$\therefore \text{Required ratio} = \frac{2\pi r^3}{3} : \frac{4\pi r^3}{3} = 1:2$$

17. Let $\frac{a}{b} = \frac{c}{d} = k$

Then $a = bk, c = dk \therefore \frac{ma+nc}{mb+nd} = \frac{mbk+ndk}{mb+nd} = k = \frac{a}{b}$

18. $T_1 = 15$ trackmen, $D_1 = 12$ days

$T_2 = 18$ trackmen, $D_2 = ?$

According to the question,

$$T_1 D_1 = T_2 D_2$$

$$\Rightarrow 15 \times 12 = 18 \times D_2$$

$$\Rightarrow D_2 = \frac{15 \times 12}{18} = 10 \text{ days}$$

19. A man 1 day's work = $\frac{1}{15}$

Man's father 1 day's work = $\frac{1}{20}$

Man's son 1 day's work = $\frac{1}{25}$

If three do together, then 1 day's work:

$$\begin{aligned} &= \frac{1}{15} + \frac{1}{20} + \frac{1}{25} \\ &= \frac{30 + 15 + 12}{300} = \frac{57}{300} \end{aligned}$$

Hence, they do the work together in $\frac{300}{57}$ days or 5.26 days.

20. Sum of five numbers

$$= 42 \times 5 = 210$$

Sum of eight numbers

$$= 81 \times 8 = 648$$

∴ Average of all numbers

$$= \frac{210 + 648}{13} = \frac{858}{13} = 66$$

21. First five Multiple of 3 = 3,6,9,12,15

$$\text{Average} = \frac{3+6+9+12+15}{5} = \frac{45}{5} = 9$$

22. $(16 - x^2) = (4 - x)(4 + x)$
 $(x^2 + x - 6) = (x + 3)(x - 2)$ LCM

of $(16 - x^2)$ and $(x^2 + x - 6)$

$$= (16 - x^2)(x - 2)(x + 3)$$

23. Speed of man = 2 m/s

$$= \frac{2 \times 18}{5} \text{ km/h} = \frac{36}{5} \text{ km/h}$$

$$\text{Time} = 1 \text{ h } 20\text{min} = \frac{80}{60} \text{ h} = \frac{4}{3} \text{ h}$$

Distance = Time \times Speed

$$= \frac{36}{5} \times \frac{4}{3} = \frac{48}{5} = 9.6 \text{ km}$$

24. Average speed of Sabir

$$\begin{aligned} &= \frac{2xy}{x+y} = \frac{2 \times 30 \times 70}{30+70} \\ &= \frac{4200}{100} = 42 \text{ km/h} \end{aligned}$$

25. Total number of Hindus in 2007 = $8000000 \times \frac{25}{100} = 2000000$

26. Required decrease percentage = $\frac{30-15}{30} \times 100 = 50\%$

27. Required difference = $(30 - 15) \% = 15\%$

28. According to the question,

$$15\% = 1200000$$

$$\therefore 20\% = \frac{1200000}{15} \times 20 = 1600000$$

29. Length of the longest pole

$$\begin{aligned} &= \sqrt{12^2 + 8^2 + 9^2} \\ &= \sqrt{144 + 64 + 81} \\ &= \sqrt{289} = 17 \text{ m} \end{aligned}$$

30. Volume of the new cube = $(9)^3 + (12)^3 + (15)^3$
= $729 + 1728 + 3375 = 5832 \text{ cm}^3$

\therefore One side of the new cube = 18 cm

31. Let the unit's place digit = x and ten's place digit = y

\therefore number = $10y + x$

and new number = $10x + y$

Sum of number

= $10y + x + 10x + y$

= $11(x + y)$

This shows that the sum of numbers is divisible by 11.

32. Let the length of first part = x m

\therefore The length of another part = $(85 - x)$ m

According to the question,

$$x = \frac{2}{3}(85 - x)$$
$$\Rightarrow 3x = 170 - 2x$$
$$\Rightarrow x = \frac{170}{5} = 34$$

\therefore The length of first part = 34 m and the length of second part = $85 - 34 = 51$ m

33. Unit's place digit in $(3127)^{173}$

= unit's place digit in $(7)^{173}$

= $7^{172+1} = (7)^1$

= unit's place digit in $1 \times 7 = 7$

34. Let the number be N .

According to the question,

$$\begin{aligned}\frac{N-4}{6} &= 8 \\ \Rightarrow N &= (8 \times 6) + 4 \\ &= 52 \\ \text{Now, } \frac{N-2}{5} &= \frac{52-2}{5} = \frac{50}{5} = 10\end{aligned}$$

35. Let $x\%$ of $0.2 = 0.008$

$$\Rightarrow \frac{x}{100} \times 0.2 = 0.008$$

$$\Rightarrow x = \frac{0.008 \times 100}{0.2} \Rightarrow x = 4$$

$$36. \frac{x}{100} \times \frac{25}{2} = 150$$

$$\Rightarrow x = \frac{150 \times 100 \times 2}{25} \Rightarrow x = 1200$$

37. Total collected amount = ₹29791 \therefore Total number of students

$$\begin{aligned}&= \sqrt[3]{29791} \\ &= \sqrt[3]{31 \times 31 \times 31} = 31\end{aligned}$$

$$38. 17^{3.5} \times 17^{7.3} \div 17^{4.2} = 17^?$$

$$\Rightarrow \frac{17^{3.5+7.3}}{17^{4.2}} = 17^?$$

$$\Rightarrow 17^{10.8-4.2} = 17^?$$

$$\Rightarrow 17^{6.6} = 17^?$$

39. Given system of linear equations are $\frac{4x}{10} + \frac{3y}{10} = \frac{17}{10}$ and $\frac{7x}{10} - \frac{2y}{10} = \frac{8}{10}$

$$\therefore 4x + 3y = 17$$

$$\text{and } 7x - 2y = 8$$

On solving Eqs. (i) and (ii), we get

$$x = 2 \text{ and } y = 3$$

40. Rate of downstream

$$= \frac{9}{2} = 4.5 \text{ km/h}$$

$$\text{Rate of upstream} = \frac{9}{6} = 1.5 \text{ km/h}$$

\therefore Rate in still water

$$= \frac{1}{2}(4.5 + 1.5) = 3 \text{ km/h}$$

Rate of the current

$$= \frac{1}{2}(4.5 - 1.5) = 1.5 \text{ km/h}$$

41. Suppose they meet x h after 8pm. Then, sum of distance covered by them in hours

$$= 240 \text{ km}$$

$$\therefore 40x + 50x = 240$$

$$\Rightarrow x = \frac{240}{90} = 2 \text{ h}40 \text{ min}$$

Hence, they will meet in 10:40 pm.

$$\begin{aligned} \mathbf{42.} \quad & \frac{3 \cdot 9^{n+1} + 9 \cdot 3^{2n-1}}{9 \cdot 3^{2n} - 6 \cdot 9^{n-1}} \\ &= \frac{3 \cdot 3^{2n+2} + 3^2 \cdot 3^{2n-1}}{3^2 \cdot 3^{2n} - 3 \times 3^{2n-2} \times 2} \\ &= \frac{3^{2n+3} + 3^{2n+1}}{3^{2n+2} - 2 \cdot 3^{2n-1}} = \frac{3^{2n+1}[9 + 1]}{3^{2n-1}[27 - 2]} \\ &= \frac{3^2 \times 10}{25} = \frac{18}{5} = 3\frac{3}{5} \end{aligned}$$

43. Total collected amount = ₹29791 \therefore Total number of students

$$\begin{aligned} &= \sqrt[3]{29791} \\ &= \sqrt[3]{31 \times 31 \times 31} = 31 \end{aligned}$$

44. Let the other angle be x° .

According to question,

$$\begin{aligned}x &= 10^\circ + \frac{1}{3}(90^\circ - x) \\ \Rightarrow x &= 10^\circ + 30^\circ - \frac{1}{3}x \\ \Rightarrow x + \frac{1}{3}x &= 40^\circ \\ \Rightarrow \frac{4x}{3} &= 40^\circ \Rightarrow x = 30^\circ\end{aligned}$$

\therefore The greater angle is $90^\circ - 30^\circ = 60^\circ$.

45. Given, distance between the points $(x, 0)$ and $(-7, 0) = 10$ units

Here, $x_1 = x, y_1 = 0, x_2 = -7$ and $y_2 = 0$

\therefore Required distance

$$\begin{aligned}&= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ \Rightarrow \sqrt{(-7 - x)^2 + (0 - 0)^2} &= 10 \\ \Rightarrow \pm(x + 7) &= 10 \\ \text{If } x + 7 &= 10, \text{ then } x = 3 \\ \text{If } -(x + 7) &= 10, \text{ then } x = -17\end{aligned}$$

46. Amount of Sulphuric acid in the new mixture $= \frac{3}{5} + \frac{7}{10} + \frac{11}{15} = \frac{61}{30}$

and amount of water in the new mixture $= \frac{2}{5} + \frac{3}{10} + \frac{4}{15} = \frac{29}{30}$

Ratio of sulphuric acid and water in the new mixture $= \frac{61}{30} : \frac{29}{30} = 61 : 29$

47. Average of remaining numbers

$$\begin{aligned}&= \frac{(38 \times 50) - (45 + 55)}{48} \\ &= \frac{1800}{48} = 37.5\end{aligned}$$

48. 6 men and 8 boys can do a work = 10 days

60 men and 80 boys can do a work = 1 day

Similarly, 26 men and 48 boys can do a work = 2 days

60 men + 80 boys = 52 men + 96 boys

8 men = 16 boys

1 man = 2 boys

6 men + 8 boys (4 men) can do a work = 10 days

10 men can do a work = 10 days

15 men + 20 boys (10 men) will complete the work = x days

25 men will complete the work = x days

$$\begin{aligned}M_1 D_1 &= M_2 D_2 \\10 \times 10 &= 25 \times x \\ \therefore x &= \frac{100}{25}\end{aligned}$$

$$\Rightarrow x = 4 \text{ days}$$

49. One day work of $A = \frac{1}{15}$

One day work of $B = \frac{1}{20}$

One day work of both

$$\begin{aligned}&= \frac{1}{15} + \frac{1}{20} \\&= \frac{4 + 3}{60} = \frac{7}{60}\end{aligned}$$

4 days work of both = $\frac{7}{60} \times 4 = \frac{7}{15}$

\therefore Remaining work = $1 - \frac{7}{15} = \frac{8}{15}$

50. $? = \sqrt{0.04}$

$$\Rightarrow ? = 0.2$$

