

# MATHEMATICS

## 1. ARITHMETIC

- Sum of three consecutive numbers is 333. What is the sum of the last two numbers?  
A) 221                      B) 220  
C) 222                      D) 223
- The sum of one-half, one-third and one-fourth of a number exceeds the number by 12. The number is  
A) 144                      B) 154  
C) 90                        D) 174
- A farmer divides his herd of  $x$  cows among his 4 sons, so that, first son gets one half of the herd, the second son gets one-fourth, the third son gets one-fifth and the fourth gets 7 cows. Then  $x$  is equal to  
A) 100                      B) 140  
C) 180                      D) 160
- If  $xy = 96$  and  $3y = 2x$ , then the value of  $x$  is  
A) 8                         B) 10  
C) 12                        D) 9
- A number divided by 156 gives 29 as remainder. If the same number is divided by 13, what will be the remainder?  
A) 3                         B) 4  
C) 5                         D) 6
- The sum of two numbers is 15 and sum of their squares is 113. The numbers are  
A) 7, 8                      B) 6, 9  
C) 5, 10                     D) 4, 11
- The sum of three consecutive odd numbers is 57. The middle one is  
A) 17                        B) 19  
C) 21                        D) 23
- In a public school,  $\frac{1}{5}$ <sup>th</sup> of girls and  $\frac{1}{4}$ <sup>th</sup> of the boys are under 12 years of age. If the total strength of the school is 1000 and number of girls is  $\frac{2}{5}$ <sup>th</sup> of the total. What is the strength of the school, who are 12 years or more of age?  
A) 230                      B) 770  
C) 280                      D) 150
- A man spends  $\frac{1}{4}$ <sup>th</sup> of his income on food,  $\frac{2}{3}$ <sup>rd</sup> of it on house rent, and the remaining which is ₹ 630 on other commodities. Find his house rent.  
A) ₹ 3520                    B) ₹ 4450  
C) ₹ 5040                    D) ₹ 5000
- Ramesh has some cows and hens. If the total number of heads be 48, and that of legs be 140, then find the number of hens.  
A) 22                        B) 23  
C) 24                        D) 26
- A tin of oil was  $\frac{3}{4}$  full. When 30 litres of oil were taken out, it was  $\frac{7}{12}$  full. Find the capacity of tin?  
A) 300 litres                B) 180 litres  
C) 200 litres                D) 240 litres
- Mukherjee gave  $\frac{5}{14}$  of his money to his son. He also gave  $\frac{2}{3}$  of the remaining sum to his daughter and the remaining to his wife. If his wife gets ₹ 3600, what was the total amount?  
A) ₹ 198000                B) ₹ 8400  
C) ₹ 16800                 D) ₹ 19200

**SURA'S ❖ MATHEMATICS**

13. A labourer is engaged for 30 days, on the condition that ₹ 50 will be paid for everyday he works and ₹ 15 will be deducted from his wages for everyday he is absent from work. At the end of 30 days he received ₹ 850 in all. For how many days did he work?  
 A) 20                      B) 15  
 C) 18                      D) 17
14. The difference between  $\frac{3}{4}$ th of  $\frac{2}{5}$ th of a number and  $\frac{4}{5}$ th of  $\frac{3}{8}$ th of the same number is 5. What is the number?  
 A) 25                      B) 40  
 C) 45                      D) 50
15. Two poles of heights 10 m and 15 m are standing on a plane surface. If their feet are 12 m apart, then find the distance between their tops?  
 A) 13 m                      B) 12 m  
 C) 12.5 m                      D) 13.5 m
16. The cost of 2 sarees and 4 shirts is ₹ 16,000. 1 saree and 6 shirts also cost the same. Find the cost of 12 shirts.  
 A) ₹ 24,000                      B) ₹ 48,000  
 C) ₹ 12,000                      D) ₹ 36,000
17. In a certain office  $\frac{1}{3}$  of the workers are women,  $\frac{1}{2}$  of the women are married and  $\frac{1}{3}$  of the married women have children. If  $\frac{3}{4}$  of the men are married and  $\frac{2}{3}$  of the married men have children, what part of workers are without children?  
 A)  $\frac{5}{18}$                       B)  $\frac{4}{9}$   
 C)  $\frac{11}{18}$                       D)  $\frac{17}{36}$
18. If the sum of two numbers be multiplied by each separately, the products so obtained are 2418 and 3666. The numbers are  
 A) 47, 31                      B) 45, 30  
 C) 45, 32                      D) 44, 37
19. The highest score in an inning was  $\frac{3}{11}$  of the total and the next highest was  $\frac{3}{11}$  of the remainder. If these scores differ by 9, the total score is  
 A) 121                      B) 99  
 C) 110                      D) 132
20. If  $\frac{5+2\sqrt{3}}{7+4\sqrt{3}} = a+b\sqrt{3}$  then  
 A)  $a = 11, b = -6$   
 B)  $a = -6, b = 11$   
 C)  $a = -11, b = 6$   
 D)  $a = -11, b = -6$

**ANSWERS**

1. (D)    2. (A)    3. (B)    4. (C)    5. (A)    6. (A)    7. (B)    8. (B)    9. (C)    10. (D)  
 11. (B)    12. (C)    13. (A)    14. (D)    15. (A)    16. (A)    17. (C)    18. (A)    19. (A)    20. (A)

**EXPLANATORY ANSWERS**

1. D) Let the numbers be  $x, x + 1, x + 2$   
 Given,  $x + x + 1 + x + 2 = 333$

$$3x = 330 \Rightarrow x = 110$$

Sum of last two numbers  
 $= 111 + 112 = 223$

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2. A) Let the number be =  $x$

$$\frac{x}{2} + \frac{x}{3} + \frac{x}{4} - 12 = x$$

$$\frac{6x + 4x + 3x - 12x}{12} = 12$$

$$\therefore \frac{x}{12} = 12 \Rightarrow x = 144$$

3. B) No. of cows =  $x$

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

$$\frac{10x + 5x + 4x}{20} + 7 = x$$

$$\Rightarrow x - \frac{19x}{20} = 7 \Rightarrow \frac{x}{20} = 7$$

$$\Rightarrow x = 140$$

4. C)  $xy = 96$  and  $3y = 2x \Rightarrow y = \frac{2x}{3}$

$$xy = 96 \Rightarrow x\left(\frac{2x}{3}\right) = 96$$

$$2x^2 = 288 \Rightarrow x^2 = 144$$

$$\Rightarrow x = 12$$

5. A) On dividing the given number 156, let K be the quotient and 29 the remainder.

$$\text{The number} = 156K + 29$$

$$13 \times 12K + 13 \times 2 + 3$$

$$\Rightarrow 13(12K + 2) + 3$$

$$\text{Quotient} = 12K + 2 \text{ and Remainder} = 3$$

6. A) Let the numbers be  $x$  and  $y$

$$\text{Given, } x + y = 15 \quad \text{--- (1)}$$

$$\Rightarrow y = 15 - x$$

$$x^2 + y^2 = 113$$

$$x^2 + (15 - x)^2 = 113$$

$$\Rightarrow x^2 + 225 + x^2 - 30x = 113$$

$$2x^2 - 30x + 112 = 0$$

$$\Rightarrow x^2 - 15x + 56 = 0$$

$$(x - 8)(x - 7) = 0$$

$$\Rightarrow x = 7, 8$$

$$\text{when } x = 7, y = 15 - 7 = 8$$

7. B) Let the numbers be  $n - 1, n + 1, n + 3$

$$\text{Given, } n - 1 + n + 1 + n + 3 = 57$$

$$3n = 54 \Rightarrow n = 18$$

Middle number

$$= n + 1 = 18 + 1 = 19$$

8. B) No. of girls =  $\frac{2}{5} \times 1000 = 400$

$$\text{No. of Boys} = 1000 - 400 = 600$$

No. of students who are under 12 years of age

$$= \frac{1}{5} \times 400 + \frac{1}{4} \times 600$$

$$= 80 + 150 = 230$$

No. of students who are

12 and above

$$= 1000 - 230 = 770$$

9. C) Let the total income = ₹  $x$

$$\frac{x}{4} + \frac{2x}{3} + 630 = x$$

$$x - \frac{x}{4} - \frac{2x}{3} = 630$$

$$\Rightarrow \frac{12x - 3x - 8x}{12} = 630$$

$$x = 630 \times 12 = 7560$$

$$\text{House rent} = \frac{2}{3}x = \frac{2 \times 7560}{3}$$

$$2 \times 2520 = \text{₹ } 5040$$

10. D) Let the number of cows and hens be  $x$  and  $y$  respectively.

$$x + y = 48$$

$$\text{--- (1)}$$

$$4x + 2y = 140$$

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$$\Rightarrow 2x + y = 70 \quad \text{--- (2)}$$

$$(1) - (2) \Rightarrow -x = -22$$

$$\Rightarrow x = 22$$

$$\text{No. of hens } y = 48 - 22 = 26$$

- 11. B)** Let the capacity of the tin be  $x$  litres

$$\frac{3x}{4} - \frac{7x}{12} = 30$$

$$\frac{9x - 7x}{12} = 30 \Rightarrow x = \frac{30 \times 12}{2}$$

$$\Rightarrow x = 180 \text{ litres}$$

- 12. C)** Let the total amount = ₹  $x$

$$\text{Amount given to his son} = \frac{5}{14}x$$

Remaining amount

$$= x - \frac{5x}{14} = \frac{9x}{14}$$

Amount given to daughter

$$= \frac{2}{3} \times \frac{9x}{14} = ₹ \frac{3x}{7}$$

Remaining amount

$$= \frac{9x}{14} - \frac{3x}{7} = \frac{3x}{14}$$

$$\Rightarrow \text{Given, } \frac{3x}{14} = 3600$$

$$\Rightarrow x = \frac{3600 \times 14}{3}$$

$$= 1200 \times 14 = ₹16800$$

- 13. A)** Let the labourer work for  $x$  days.

He is absent for  $30 - x$  days.

$$\therefore 50x - (30 - x)15 = 850$$

$$65x = 850 + 450$$

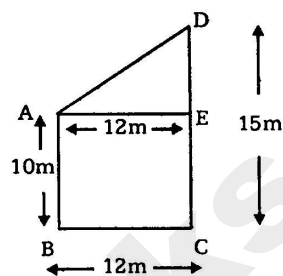
$$\Rightarrow x = \frac{1300}{65} = 20$$

**14. D)**  $\frac{3}{4} \times \frac{2}{5}x - \frac{4}{5} \times \frac{2}{8}x = 5$

$$\frac{3x}{10} - \frac{x}{5} = 5 \Rightarrow 3x - 2x = 50$$

$$\Rightarrow x = 50$$

- 15. A)** Let the height of pole AB = 10 m and CD = 15 m



$$BC = 12 \text{ m} = AE \quad \text{and} \\ DE = CD - EC = 15 - 10 = 5 \text{ m}$$

$$AD = \sqrt{12^2 + 5^2} = \sqrt{144 + 25}$$

$$= \sqrt{169} = 13 \text{ m}$$

- 16. A)** Let the cost of 1 saree = ₹  $x$  and the cost of 1 shirt = ₹  $y$

$$\text{Given, } 2x + 4y = 16,000 \quad \text{---(1)}$$

$$x + 6y = 16,000 \quad \text{---(2)}$$

$$(1) - (2) \times 2 \Rightarrow -8y = -16,000$$

$$\Rightarrow y = 2000$$

$$\text{Cost of 12 shirts} = 12 \times 2000$$

$$= ₹ 24,000$$

- 17. C)** Let the total number of workers =  $x$

$$\text{No. of women} = \frac{x}{3} \quad \text{and}$$

$$\text{No. of men} = \frac{2}{3}x$$

$$\text{Number of women having children} = \frac{1}{3} \text{ of } x$$

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$$\frac{1}{2} \text{ of } \frac{1}{3}x = \frac{1}{18}x$$

No. of men having children

$$= \frac{2}{3} \text{ of } \frac{3}{4} \text{ of } \frac{2}{3}x = \frac{1}{3}x$$

$$\text{No. of workers having children} = \frac{x}{18} + \frac{x}{3} =$$

$$\frac{7x}{18}$$

No. of workers having no children =  $x -$

$$\frac{7x}{18} = \frac{11x}{18}$$

**18. A)** Let the numbers be  $x$  and  $y$

$$x(x + y) = 2418 \text{ — (1)}$$

$$y(x + y) = 3666 \text{ — (2)}$$

$$(1) + (2) \Rightarrow (x + y)^2 = 6048$$

$$x + y = 78 \text{ — (3)}$$

$$(2) - (1) \Rightarrow y^2 - x^2 = 1248$$

$$(y + x)(y - x) = 1248$$

$$y - x = \frac{1248}{78} = 16 \text{ — (4)}$$

$$(3) + (4) \Rightarrow 2y = 94 \Rightarrow y = 47$$

$$\therefore x = 78 - 47 = 31$$

**19. A)** Let the total score be =  $x$

$$\therefore \text{Highest score} = \frac{3x}{11}$$

$$\text{Remainder} = x - \frac{3x}{11} = \frac{8x}{11}$$

Next highest score

$$= \frac{3}{11} \text{ of } \frac{8x}{11} = \frac{24x}{121}$$

$$\text{Given, } \frac{3x}{11} - \frac{24x}{121} = 9$$

$$\Rightarrow \frac{33x - 24x}{121} = 9$$

$$\Rightarrow 9x = 9 \times 121$$

$$\Rightarrow x = 121$$

$$\mathbf{20. A)} \quad \frac{5 + 2\sqrt{3}}{7 + 4\sqrt{3}} \times \frac{7 - 4\sqrt{3}}{7 - 4\sqrt{3}}$$

$$= \frac{35 - 24 - 6\sqrt{3}}{49 - 48}$$

$$= \frac{11 - 6\sqrt{3}}{1}$$

$$\text{Given, } \frac{5 + 2\sqrt{3}}{7 + 4\sqrt{3}} = a + b\sqrt{3}$$

$$= 11 - 6\sqrt{3}$$

$$\mathbf{a = 11, b = -6}$$

