

TEST-3 AVERAGE, PERCENTAGE

1. The average of Sohan's marks in 6 subjects is 74. If his average in five subjects excluding science is 70, how many marks he obtained in science?

- A. 94
- B. 92
- C. 90
- D. 88

Answer : A

Total marks obtained in 6 subjects = $6 * 74 = 444$

Total marks in 5 subjects excluding science = $5 * 70 = 350$

Therefore, marks obtained in science would be = $444 - 350 = 94$

2. Average age of a group of 30 boys is 16 years. A boy of age 19 leaves the group and a new boy joins the group. If the new average age of the group is 15.8 years, find the age of the new boy.

- A. 12 years
- B. 13 years
- C. 14 years
- D. 15 years

Answer: B

Let the age of new boy = X years

Total age of 30 boys = $30 * 16 = 480$ years

As per question, if we minus age of boy who leaves the group and then add the age of boy who joins the group the new average becomes = 15.8 years.

$$\therefore \frac{30 * 16 - 19 + X}{30} = 15.8$$

$$480 - 19 + X = 474$$

$$X = 474 - 480 + 19$$

$$X = -6 + 19$$

$$= 13 \text{ years}$$

3. The average weight of 10 men is decreased by 2 kg when one of them whose weight is 60 kg is replaced by a new man. What is the weight of the new man?

- A. 35 kg
- B. 40 kg
- C. 45 kg
- D. 50 kg

Answer: B

Average decrease in weight per person = 2kg

There are 10 men so total decrease in weight on replacing a man with a new man = $10 * 2 = 20$ kg

Weight of the man who is replaced = 60 kg

∴ The weight of the new man would be = Weight of man replaced - total decrease in weight of the group of 10 men.

$$= 60 - 20 = 40 \text{ kg}$$

4. The average age of 30 boys in a class is 15 years. If we include the age of two teachers the average age increases by 1. Find the sum of ages of the two teachers.

- A. 55 years
- B. 58 years
- C. 62 years
- D. 64 years

Answer: C

Total age of 30 boys would be = $30 * 15 = 450$ years

Total age of 30 boys and 2 teachers would be = $32 * 16 = 512$ years

∴ Sum of ages of two teachers would be = $512 - 450 = 62$ years

5. A group consists of two male, two female and three children. The average age of the male is 67 years, that of the female is 35 years, and that of the children is six years. What is the average age of the group?

- A. 30.71
- B. 31.71
- C. 28.71

D. 35.45

Answer: B

$$\begin{aligned}\text{Average} &= (67*2+35*2+6*3) / 7 \\ &= (134+70+18) / 7 \\ &= 222 / 7 \\ &= 31.71\end{aligned}$$

6. Mohan gets a salary of Rs. 6435, Rs. 6927, Rs. 6855, Rs. 7230 and Rs. 6562 for 5 months. How much salary he must have in the sixth month so that he gets an average of Rs. 6500?

- A. 4091
- B. 4991
- C. 3499
- D. 3344

Answer: B

Total salary for 5 months = Rs. (6435 + 6927 + 6855 + 7230 + 6562) = Rs. 34009.

$$\begin{aligned}\text{Required salary} &= \text{Rs. } [(6500 \times 6) - 34009 \\ &= \text{Rs. } (39000 - 34009) \\ &= \text{Rs. } 4991\end{aligned}$$

7. The captain of a cricket team of 11 members is 26 years old, and the wicket-keeper is three years older than the captain. If the ages of captain and wicketkeeper are excluded, the average age of the remaining players of the team is one year less than the average age of the whole team. What is the average age of the team?

- A. 19
- B. 49
- C. 17
- D. 23

Answer: D

Let the average age of the whole team by x years.

$$\begin{aligned}11x - (26 + 29) &= 9(x - 1) \\ 11x - 55 &= 9x - 9 \\ 11x - 9x &= - 9 + 55 \\ 2x &= 46 \\ x &= 23 \text{ Years.}\end{aligned}$$

8. The average monthly income of Rakesh and Suresh is Rs. 5050. The average monthly income of Suresh and Ramesh is Rs. 6250 and the average monthly income of Rakesh and Ramesh is Rs. 5200. What is the monthly income of Rakesh?

- A. 3000
- B. 6000
- C. 4000
- D. 2500

Answer: C

Rakesh + Suresh (total income) = $5050 \times 2 = 10100$ (i)

Suresh + Ramesh (total income) = $6250 \times 2 = 12500$ (ii)

Rakesh + Ramesh (total income) = $5200 \times 2 = 10400$ (iii)

Adding (i), (ii) and (iii), we get: $2(P + Q + R) = 33000$ or $P + Q + R = 16500$ (iv)

Subtracting (ii) from (iv), we get $P = 4000$.

So, Rakesh's monthly income = Rs. 4000.

9. In Varun's opinion, his weight is greater than 65 kg but less than 72 kg. His father does not agree with Varun, and he thinks that Varun's weight is greater than 60 kg but less than 70 kg. His sister's view is that his weight cannot be greater than 68 kg. If all are correct in their estimation, what is the average of the different possible weights of Varun?

- A. 60
- B. 65
- C. 67
- D. 54

Answer: C

Let Arun's weight by X kg.

According to Varun: $65 < X < 72$

According to Varun's father: $60 < X < 70$.

According to Varun's sister: $X \leq 68$

The different possible weights of Varun or the values that satisfy all the above conditions are 66, 67 and 68.

So, the Average of different possible weights of Varun = $(66+67+68) / 3$

= $201/3$

= 67 kg.

10. The average weight of P, Q and R is 45 kg. If the average weight of P and Q is 40 kg and that of Q and R is 43 kg, what is the weight of Q?

- A. 32
- B. 65
- C. 67
- D. 31

Answer: D

Let P, Q, R represent their respective weights. Then, we have:

$$P + Q + R = (45 \times 3) = 135.... (i)$$

$$P + Q = (40 \times 2) = 80.... (ii)$$

$$Q + R = (43 \times 2) = 86.... (iii)$$

$$\text{Adding (ii) and (iii), we get: } P + 2Q + R = 166.... (iv)$$

$$\text{Subtracting (i) from (iv), we get: } Q = 31.$$

11. A museum has an average of 510 visitors on Sunday and 240 on other days. Find the average number of visitors per day in a month of 30 days beginning with a Sunday.

- A. 285
- B. 275
- C. 237
- D. 245

Answer: A

Since, the month begins with a Sunday, so there will be 5 Sundays and 25 other days in this month.
So, the average no. of visitor per day

$$\frac{510 \times 5 + 240 \times 25}{30} \\ = 285$$

12. Find the average of the square of first 6 consecutive even numbers starting from 2 to 12, where the last even number is 12.

- A. 12.20
- B. 60.66
- C. 16.45

D. 178

Answer: B

$$\begin{aligned}\text{Average} &= \frac{(X+1)(X+2)}{3} \\ &= \frac{(12+1)(12+2)}{3} \\ &= 13 \times 14 / 3 \\ &= 182 / 3 \\ &= 60.66\end{aligned}$$

13. In the first 10 overs of a cricket game, the run rate was only 3.2. What should be the run rate in the remaining 40 overs to reach the target of 282 runs?

- A. 6.25
- B. 6.5
- C. 6.75
- D. 7

Answer: A

$$\text{Required run rate} = \left(\frac{282 - (3.2 \times 10)}{40} \right) = \frac{250}{40} = 6.25$$

14. A grocer has a sale of Rs. 6435, Rs. 6927, Rs. 6855, Rs. 7230 and Rs. 6562 for 5 consecutive months. How much sale must he have in the sixth month so that he gets an average sale of Rs. 6500?

- A. Rs. 4991
- B. Rs. 5991
- C. Rs. 6001
- D. Rs. 6991

Answer: A

Total sale for 5 months = Rs. (6435 + 6927 + 6855 + 7230 + 6562) = Rs. 34009.

$$\begin{aligned}\therefore \text{Required sale} &= \text{Rs. } [(6500 \times 6) - 34009] \\ &= \text{Rs. } (39000 - 34009) \\ &= \text{Rs. } 4991.\end{aligned}$$

15. The average age of husband, wife and their child 3 years ago was 27 years and that of wife and the child 5 years ago was 20 years. The present age of the husband is:

- A. 35 years
- B. 40 years
- C. 50 years
- D. None of these

Answer: B

Sum of the present ages of husband, wife and child = $(27 \times 3 + 3 \times 3)$ years = 90 years.

Sum of the present ages of wife and child = $(20 \times 2 + 5 \times 2)$ years = 50 years.

\therefore Husband's present age = $(90 - 50)$ years = 40 years.

16. A batsman scored 110 runs which included 3 boundaries and 8 sixes. What percent of his total score did he make by running between the wickets?

- a) 45%
- b) $45\frac{5}{11}\%$
- c) $54\frac{6}{11}\%$
- d) 55%

Answer: Option **(B)**

Explanation:

Number of runs made by running = $110 - (3 \times 4 + 8 \times 6)$

= $110 - (60)$

= 50.

\therefore Required percentage = $\left(\frac{50}{110} \times 100 \right) \% = 45\frac{5}{11}\%$

Video Explanation: <https://youtu.be/X2zTnABqEHU>

17. Two students appeared at an examination. One of them secured 9 marks more than the other and his marks was 56% of the sum of their marks. The marks obtained by them are:

- a) 39, 30
- b) 41, 32
- c) 42, 33
- d) 43, 34

Answer: Option (C)

Explanation:

Let their marks be $(x + 9)$ and x .

$$\text{Then, } x + 9 = \frac{56}{100}(x + 9 + x)$$

$$\Rightarrow 25(x + 9) = 14(2x + 9)$$

$$\Rightarrow 3x = 99$$

$$\Rightarrow x = 33$$

So, their marks are 42 and 33.

18. A fruit seller had some apples. He sells 40% apples and still has 420 apples. Originally, he had:

- a) 588 apples
- b) 600 apples
- c) 672 apples
- d) 700 apples

Answer: Option (D)

Explanation:

Suppose originally he had x apples.

Then, $(100 - 40)\%$ of $x = 420$.

$$\Rightarrow \frac{60}{100} \times x = 420$$

$$\Rightarrow x = \left(\frac{420 \times 100}{60} \right) = 700.$$

Video Explanation: <https://youtu.be/-Pv25Do3WwY>

19. What percentage of numbers from 1 to 70 have 1 or 9 in the unit's digit?

- a) 1
- b) 14
- c) 20
- d) 21

Answer: Option **C**

Explanation:

Clearly, the numbers which have 1 or 9 in the unit's digit, have squares that end in the digit 1. Such numbers from 1 to 70 are 1, 9, 11, 19, 21, 29, 31, 39, 41, 49, 51, 59, 61, 69.

Number of such number = 14

$$\therefore \text{Required percentage} = \left(\frac{14}{70} \times 100 \right) \% = 20\%.$$

Video Explanation: <https://youtu.be/cBamI6iRNIA>

20. If $A = x\%$ of y and $B = y\%$ of x , then which of the following is true?

- a) A is smaller than B.
- b) A is greater than B
- c) If x is smaller than y , then A is greater than B.
- d) None of these

Answer: Option **~~C~~**

None of these

Explanation:

$$x\% \text{ of } y = \left(\frac{x}{100} \times y \right) = \left(\frac{y}{100} \times x \right) = y\% \text{ of } x$$

$$\therefore A = B.$$

21. If 20% of $a = b$, then $b\%$ of 20 is the same as:

- a) 4% of a
- b) 5% of a
- c) 20% of a
- d) None of these

Answer: Option (A)

Explanation:

$$20\% \text{ of } a = b \Rightarrow \frac{20}{100}a = b.$$

$$\therefore b\% \text{ of } 20 = \left(\frac{b}{100} \times 20 \right) = \left(\frac{20}{100}a \times \frac{1}{100} \times 20 \right) = \frac{4}{100}a = 4\% \text{ of } a.$$

22. Three candidates contested an election and received 1136, 7636 and 11628 votes respectively. What percentage of the total votes did the winning candidate get?

- a) 57%
- b) 60%
- c) 65%
- d) 90%

Answer: Option (A)

Explanation:

Total number of votes polled = $(1136 + 7636 + 11628) = 20400$.

$$\therefore \text{Required percentage} = \left(\frac{11628}{20400} \times 100 \right) \% = 57\%.$$

23. Two tailors X and Y are paid a total of Rs. 550 per week by their employer. If X is paid 120 percent of the sum paid to Y, how much is Y paid per week?

- a) Rs. 200
- b) Rs. 250
- c) Rs. 300
- d) None of these

Answer: Option (B)

Explanation:

Let the sum paid to Y per week be Rs. z .

Then, $z + 120\% \text{ of } z = 550$.

$$\Rightarrow z + \frac{120}{100}z = 550$$

$$\Rightarrow \frac{11}{5}z = 550$$

$$\Rightarrow z = \left(\frac{550 \times 5}{11} \right) = 250.$$

24) Gauri went to the stationers and bought things worth Rs. 25, out of which 30 paise went on sales tax on taxable purchases. If the tax rate was 6%, then what was the cost of the tax free items?

- a) Rs. 15
- b) Rs. 15.70
- c) Rs. 19.70
- d) Rs. 20

Answer: Option (C)

Explanation:

Let the amount taxable purchases be Rs. x .

$$\text{Then, } 6\% \text{ of } x = \frac{30}{100}$$

$$\Rightarrow x = \left(\frac{30}{100} \times \frac{100}{6} \right) = 5.$$

$$\therefore \text{Cost of tax free items} = \text{Rs. } [25 - (5 + 0.30)] = \text{Rs. } 19.70$$

25. Rajeev buys good worth Rs. 6650. He gets a rebate of 6% on it. After getting the rebate, he pays sales tax @ 10%. Find the amount he will have to pay for the goods.

- a) Rs. 6876.10
- b) Rs. 6999.20
- c) Rs. 6654
- d) Rs. 7000

Answer: Option (A)

Explanation:

$$\text{Rebate} = 6\% \text{ of Rs. } 6650 = \text{Rs. } \left(\frac{6}{100} \times 6650 \right) = \text{Rs. } 399.$$

$$\text{Sales tax} = 10\% \text{ of Rs. } (6650 - 399) = \text{Rs. } \left(\frac{10}{100} \times 6251 \right) = \text{Rs. } 625.10$$

$$\therefore \text{Final amount} = \text{Rs. } (6251 + 625.10) = \text{Rs. } 6876.10$$

Video Explanation: <https://youtu.be/XuiggCTh3SU>

26. The population of a town increased from 1,75,000 to 2,62,500 in a decade. The average percent increase of population per year is:

- a) 4.37%
- b) 5%
- c) 6%
- d) 8.75%

Answer: Option **B**

Explanation:

Increase in 10 years = $(262500 - 175000) = 87500$.

$$\text{Increase\%} = \left(\frac{87500}{175000} \times 100 \right) \% = 50\%.$$

$$\therefore \text{Required average} = \left(\frac{50}{10} \right) \% = 5\%.$$

27. If $16\frac{2}{3}\%$ of a number is added to itself, the number becomes 1400. Find the original number.

- a. 1100
- b. 1356
- c. 1000
- d. 1200

Answer: d

Explanation:

Let the number is = x

Now, $16\frac{2}{3}\% = 16\frac{2}{3} \times \frac{1}{100} = \frac{1}{6}$

So, we have, $x + \frac{x}{6} = \frac{7x}{6}$

As per question, $\frac{7x}{6} = 1400$

So, $x = \frac{6 \times 1400}{7} = 1200$

28. A number is supposed to multiply by $\frac{3}{4}$ but by mistake, it is divided by $\frac{3}{4}$. Find the % error.

- a. 77.77% error
- b. 36% error
- c. 10% error
- d. No error

Answer: a

Explanation:



Note: A number divided by $\frac{3}{4}$ = multiplied by $\frac{4}{3}$.

Now, take LCM of denominators of $\frac{3}{4}$, and $\frac{4}{3}$

i.e., LCM of 4 and 3 = 12

i.) $(\frac{3}{4}) * 12 = 9$

ii.) $(\frac{4}{3}) * 12 = 16$

Difference = $16 - 9 = 7$, and original = 9

$(\frac{7}{9}) * 100 = 77.77\%$ error.

29. If the radius of a circle is increased by 50%, what will be the percentage increase in its area?

- a. 150%
- b. 50%
- c. 100%
- d. 125%

Answer: d

Explanation:

Solution 1:

Concept: 50% increment $\frac{1 \text{ (increment)}}{2 \text{ (original value)}}$

The above concept shows that when the old value is 2 units then a 50% increment means an increase of one unit, i.e. the old value becomes 3 after a 50% increment.

i.e. old value = 2 new value after 50% increment = 2 + 1 = 3

Let old radius = 2, and after the increment, it becomes 3.

i.e., Old area: new area

$\pi * (2)^2 : \pi * (3)^2$

Cancel the constant term, we get

4: 9

The difference between old and new is 5 (4-5).

i.e., required % = $(\text{diff}/\text{original}) * 100$

$(5/4) * 100 = 125\%$

So, the area of the circle increases by 125%.

Solution 2:

Area = $\pi * r * r$

π is constant so it can be neglected.

$R * R = A$

Old: $2 * 2 = 4$

New: $3 * 3 = 9$

Difference between area = 5, and original = 4

So, the percentage increase in area = $(5/4) * 100 = 125\%$

30. A candidate who scores 30% fails by 5 marks, while another candidate who scores 40% marks gets 10 more than minimum passing marks. The minimum marks required to pass are:

- a. 50
- b. 100
- c. 45
- d. 150

Answer: a

Explanation:

Let the total marks = x

Now, candidate A scores 30% of the total marks and fails by 5 marks and another candidate scores 40% of the total marks which is 10 more than the minimum passing marks.

$$\text{So, } (30/100)*x + 5 = (40/100)*x - 10$$

$$(3/10)*x + 5 = (4/10)*x - 10$$

$$(3x + 50)/10 = (4x - 100)/10$$

$$3x + 50 = 4x - 100$$

$$x = 150$$

$$\text{Marks of Candidate A} = 30\% \text{ of } 150 = 45$$

Candidate A fails by 5 marks.

$$\text{So, minimum passing marks} = 45 + 5 = 50$$