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 x 4 + 8 x 6)

= 110 - (60)

= 50.

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

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2. 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.

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.

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3. 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.

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

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

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4. 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

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

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5. 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. Relationship between A and B cannot be determined.
D. If x is smaller than y, then A is greater than B.
E. None of these
Answer: Option E

Explanation:

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

$\therefore$ A = B.

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

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

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7. In a certain school, 20% of students are below 8 years of age. The number of students above 8 years of age is $\frac{2}{3}$ of the number of students of 8 years of age which is 48. What is the total number of students in the school?
A. 72
B. 80
C. 120
D. 150
E. 100
Answer: Option E

Explanation:

Let the number of students be x. Then,

Number of students above 8 years of age = (100 - 20)% of x = 80% of x.

$\therefore$ 80% of $x = 48 + \frac{2}{3}$ of 48

$\Rightarrow \frac{80}{100}x = 80$

$\Rightarrow x = 100.$

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8. Two numbers A and B are such that the sum of 5% of A and 4% of B is two-third of the sum of 6% of A and 8% of B. Find the ratio of A : B.
A. 2 : 3
B. 1 : 1
C. 3 : 4
D. 4 : 3

Answer: Option D

Explanation:

5% of A + 4% of B = $\frac{2}{3}$ (6% of A + 8% of B)

$\Rightarrow \frac{5}{100}A + \frac{4}{100}B = \frac{2}{3}\left(\frac{6}{100}A + \frac{8}{100}B\right)$

$\Rightarrow \frac{1}{20}A + \frac{1}{25}B = \frac{1}{25}A + \frac{4}{75}B$

$\Rightarrow \left(\frac{1}{20} - \frac{1}{25}\right)A = \left(\frac{4}{75} - \frac{1}{25}\right)B$

$\Rightarrow \frac{1}{100}A = \frac{1}{75}B$

$\frac{A}{B} = \frac{100}{75} = \frac{4}{3}$.

$\therefore$ Required ratio = 4 : 3

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9. A student multiplied a number by $\frac{3}{5}$ instead of $\frac{5}{3}$.
What is the percentage error in the calculation?
A. 34%
B. 44%
C. 54%
D. 64%
Answer: Option D

Explanation:

Let the number be x.

Then, error = $\frac{5}{3}x - \frac{3}{5}x = \frac{16}{15}x$.

Error% = $\left(\frac{\frac{16}{15}x}{x} \times 100\right)\% = 64\%$.

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10. In an election between two candidates, one got 55% of the total valid votes, 20% of the votes were invalid. If the total number of votes was 7500, the number of valid votes that the other candidate got, was:
A. 2700
B. 2900
C. 3000
D. 3100

Answer: Option A

Explanation:

Number of valid votes = 80% of 7500 = 6000.

∴ Valid votes polled by other candidate = 45% of 6000

$= \left(\frac{45}{100} \text{ x } 6000 \right) = 2700.$

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.

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

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12. 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% of *z* = 550.

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

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

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

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13. 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.

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

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

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

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14 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:

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

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

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

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15 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.

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

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

1. *Concept of Percentage:*

   By a certain *percent*, we mean that many hundredths.

   Thus, *x* percent means *x* hundredths, written as *x*%.

   To express *x*% as a fraction: We have, $x\% = \frac{x}{100}$.

   Thus, $20\% = \frac{20}{100} = \frac{1}{5}$.

   To express $\frac{a}{b}$ as a percent: We have, $\frac{a}{b} = \left(\frac{a}{b} \text{ x } 100\right)\%$.

   Thus, $\frac{1}{4} = \left(\frac{1}{4} \text{ x } 100\right)\% = 25\%$.

2. *Percentage Increase/Decrease:*

   If the price of a commodity increases by R%, then the reduction in consumption so as not to increase the expenditure is:

   $$\left[\frac{R}{(100 + R)} \text{ x } 100\right]\%$$

   If the price of a commodity decreases by R%, then the increase in consumption so as not to decrease the expenditure is:

   $$\left[\frac{R}{(100 - R)} \text{ x } 100\right]\%$$

3. *Results on Population:*

   Let the population of a town be P now and suppose it increases at the rate of R% per annum, then:

   1. Population after *n* years $= P\left(1 + \frac{R}{100}\right)^n$

   2. Population *n* years ago $= \frac{P}{\left(1 + \frac{R}{100}\right)^n}$

4. *Results on Depreciation:*

   Let the present value of a machine be P. Suppose it depreciates at the rate of R% per annum. Then:

   1. Value of the machine after *n* years $= P\left(1 - \frac{R}{100}\right)^n$

2. Value of the machine *n* years ago = $\left(1 - \frac{R}{100}\right)^{n} P$

3. If A is R% more than B, then B is less than A by $\left[\frac{R}{(100 + R)} \times 100\right]\%$.

4. If A is R% less than B, then B is more than A by $\left[\frac{R}{(100 - R)} \times 100\right]\%$.
