



Explore | Expand | Enrich

PERCENTAGES



Concepts

Percentage is a fraction whose denominator is always 100. x percentage is represented by $x\%$.

To express $x\%$ as a fraction: $x\% = x/100$

Thus $10\% = 10/100$ (means 10 parts out of 100 parts) $= 1/10$ (means 1 part out of 10 parts)

To express x/y as a percentage: $x/y = (x/y \times 100)$

Thus $1/4 = (1/4 \times 100)\% = 25\%$ and $0.8 = (8/10 \times 100)\% = 80\%$



If the price of a commodity increases by $R\%$, then reduction in consumption as not to increase the expenditure is: $\left[\frac{R}{100+R} \times 100 \right] \%$

If the price of a commodity decreases by $R\%$, then the increase in consumption as not to decrease the expenditure is: $\left[\frac{R}{100-R} \times 100 \right] \%$

Result on Population: Let the population of a town be P now and suppose increases the rate of $R\%$ per annum, then:

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

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



Result on Depreciation: Let the present value of a machine be P . Suppose depreciates at the rate of $R\%$ per annum Then:

1. Value of the machine after n Years = $P (1 - R/100)^n$

2. Value of the machine n years ago = $P / (1 - R/100)^n$

If A is $R\%$ more than B , then B is less than A by $[R/(100+R) \times 100]\%$ If A is

$R\%$ less than B , then B is more than A by $[R/(100-R) \times 100]\%$

Net % change = $x + y + xy/100$



Question: 01



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: C



Explanation:

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

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

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

$$3x = 99$$

$$x = 33$$

So, their marks are 42 and 33.



Question: 02



Three candidates, Ajay, Bijoy & Chandu contested an election and received 1800, 3300 and votes 3900 respectively. What percent of the total votes did A get?

- A. 20%
- B. 40%
- C. 45%
- D. 70%

Answer: A



Explanation:

Total no. of votes polled = $(1800 + 3300 + 3900) = 9000$.

Required percentage = $(1800/9000 * 100)\% = 20\%$.



Question: 03

The total population of a village increased from 1,80,00 to 22, 500 in a decade. The average percentage increase of population per year of that village is:

- A. 2.37%
- B. 2.5%
- C. 3. 6%
- D. 6.75%

Answer: B



Explanation:

Population increase in 10 years = $(22500 - 18000) = 4500$.

Increase% = $(4500/18000 \times 100)\% = 25\%$

Required average = $(25/10)\% = 2.5\%$



Question: 04



What percentage of numbers from 1 to 30 has 1 or 9 in the unit's digit?

- A. 12
- B. 15
- C. 20
- D. 22

Answer: C



Explanation:

Such numbers from 1 to 30 are 1, 9, 11, 19, 21, 29

Number of such numbers = 6

Required percentage is $(6/20 * 100) \% = 20\%$



Question: 05



In ABC College, 63% of students are less than 20 years of age. The number of students more than 20 years of age is $\frac{2}{3}$ of number of students of 20 years of age which is 42. What is the total number of students in the ABC College?

- A. 75
- B. 90
- C. 130
- D. 200

Answer: D



Explanation:

Let the total number of students be x .

Then, Number of students more than 20 years of age = $(100 - 63)\%$ of $x = 37\%$ of x .

$$37\% \text{ of } x = 42 + \frac{2}{3} \text{ of } 48$$

$$\frac{37}{100} x = 74$$

$$x = 200$$



Question: 06

The tax on an article is increased by 20 %. As a result of which the consumption decreases by 25 %. What is the % change in the tax revenue received by the government from this article?

- A. 10 % decrease
- B. 15 % increase
- C. 10 % increase
- D. None of these

Answer: A



Explanation:

% Change in Tax revenue = $1.2 * 0.75 = 0.9$

⇒ Net decrease of 10 %.



Question: 07

Ali the barber shaved 40 % of his customers and gave a haircut to 80 % of his customers. He charged Rs. 7 for a shave and Rs. 5 for a haircut. If 20 % of customers who opted for a shave also had a haircut, what were Khan's earnings if he had 75 customers (in Rs.)?

- A. 410
- B. 1,020
- C. 510
- D. None of these

Answer: C



Explanation:

Explanation: Total customers = 75

Numbers of customers shaved = $75 * 40/100 = 30$

Number of customers who got hair cut = $75 * 80/100 = 60$

\therefore His total income = $(30 * 7) + (60 * 5) = 210 + 300 = 510$.



Question: 08



Alroy gave his sister 40 % of his pocket money and was left with Rs. 8. What is his pocket money (in Rs.)?

- A. 20
- B. 13.33
- C. 11.20
- D. 12.80

Answer: B



Explanation:

He gave his sister 40 % i.e. he is left with 60 % of the total money which is Rs. 8.

Hence $60x/100 = 8 \Rightarrow x = 13.33$.



Question: 09

Class B has 50% more students than class A. Number of girls in class A is equal to number of boys in class B. The percentage of girls is the same in both classes. What percentage of the student group are boys?

- A. 33.33%
- B. 40%
- C. 25%
- D. 60%

Answer: B



Explanation:

50% more than x is $1.5x$. Simple, but very useful idea that might help you in solving these kinds of problems.

Let number of girls in class A = x

Let number of boys in class A = y

Total number of students = $x + y$

Proportion of girls = $x/x+y$

Number of boys in class B = x

Total number of students in class B = $1.5(x + y)$

Proportion of girls = $1 - x/1.5(x + y)$



Explanation:

Percentage of boys in the overall student community = $\frac{x+y}{2.5} * (x + y) * 100 = 40\%$

The question is " What percentage of the student group are boys? "

40% of the student group are boys

Hence, the answer is 40%



Question: 10

In an examination, 35% of students failed in quants and 42% of students failed in verbal while 14% failed in both the topics. If 222 students passed in both the topics, how many students appeared to write the examination?

- A. 500
- B. 600
- C. 700
- D. 800

Answer: B



Explanation:

Finding out percent of students failing either one would help.

Percent of students failing quants = 35

Percent of students failing verbal = 42


Sum = $35 + 42 = 77$

Percent of students failing both = 14

=> Percent of students failing either one = $77 - 14 = 63$. Thus, 37% students passed in both the topics

=> 37% of $x = 222$

=> $x = 600$



Question: 11

An electric iron is offered at a discount of 10%. It is sold during clearance sale at 6% discount over the already discounted price at Rs. 1692/- . The original marked price of the electric iron is:

- A. Rs. 2000/-
- B. Rs. 1896/-
- C. Rs. 1900/-
- D. Rs. 1946/-

Answer: A

Explanation:

SP before 6% discount = $1692 * 100/94$

So, original MP = $1692 \times 100/94 * 100/90 = 2000$



Question: 12

A student took five papers in an examination, where the full marks were the same for each paper. His marks in these papers were in the proportion of 3: 4: 9: 11: 13. In all papers together, the candidate obtained 60% of the total marks. Then, the number of papers in which he got less than 70% marks is:

- A. 1
- B. 3
- C. 4
- D. 5

Answer: B

Explanation:

Let the marks scored in five subjects be $3x$, $4x$, $9x$, $11x$ and $13x$

Total marks in all the five subjects = $40x$

Max marks of the five subjects = $40x/0.6$

(\because $40x$ is 60% of total marks)

\therefore Max marks in each subject = $40x/(0.6 \times 5) = 13.3x$

Hence, percentage in each subject = $3x/13.33x \times 100$,

$4x/13.33 \times 100$, $9x/13.33x \times 100$, $(11x \times 100)/13.33x$ and $(16x \times 100)/13.33x$

Or 22.50%, 30 %, 67.51%, 82.52% and 97.52%

\therefore Number of papers in which he got less than 70% marks is 3.

Question: 13

$\frac{2}{5}$ of the voters promise to vote for A and the rest promised to vote for B. Of these, on the last day 15% of the voters went back their promise to vote for A and 25% of voters went back of their promise to vote for B, and A lost by 4 votes. Then, the total number of voters is:

- A. 200
- B. 210
- C. 190
- D. 195

Answer: A

Explanation:

Let total number of votes polled by 100%, then votes polled in favour of P = $40 - 6 + 15 = 49\%$

Voters polled in favour of Q = $60 - 15 + 6 = 51\%$

Difference = $51 - 49 = 2\%$

It is already given that a lost by 4 votes, hence total number of votes polled = 200.



Question: 14

A man bought two books for Rs. 250 each. If he sells one at a profit of 5%, then how much should he sell the other so that he makes a profit of 20% on the whole?

- A. 32
- B. 29
- C. 35
- D. 24

Answer: C



Explanation:



Before we start, it's important to note here that it is not 15% to be added to 5% to make it a total of 20%.

Let the other profit percent be x .

Then, our equation looks like this.

$$105/100 * 250 + [(100+x)/100] * 250 = 120/100 * 500 \rightarrow x = 35.$$

Hence, if he makes a profit of 35% on the second, it comes to a total of 20% profit on the whole.



Question: 15

In an examination it is required to get 40% of the aggregate marks to pass. A student gets 522 marks and is declared failed by 4% marks. What are the maximum aggregate marks a student can get?

- A. 1700
- B. 1730
- C. 1450
- D. 1765

Answer: C



Explanation:

Let the total marks be x .

4% less than 40% is 522

So, 36% of the total marks = 522

$$36/100 \times x = 522$$

$$x = 522 \times 100/36$$

$$x = 1450$$



THANK YOU

