

APTITUDE MASTERY SERIES**MODULE 4 – PERCENTAGE**

1. In XYZ College, 65% of students are less than 20 years of age. The number of students more than 20 years of age is $\frac{2}{3}$ rd of number of students of 20 years of age which is 42. What is the total number of students in the College?

- (a) 75 (b) 90 (c) 130 **(d) 200**

Solution:

Let the total number of students be x .

Then, Number of students more than 20 years of age = $(100 - 65) \%$ of $x = 35\%$ of x .

$$35\% \text{ of } x = 42 + \frac{2}{3} \text{ of } 42$$

$$\frac{35}{100}x = 70$$

$$x = 200$$

2. A student attempts x number of questions. He answers 15 correctly out of first 20 questions and of the remaining questions, he answers $\frac{1}{3}$ correctly. If all questions have same credit and the student gets 50 % marks, then find the value of x ?

- (a) 35 (b) 40 **(c) 50** (d) 55

Solution:

1) Student attempts x questions.

2) Out of 20 questions he answers 15 correctly and of $(x - 20)$ questions he answered $\frac{1}{3}$ correctly.

3) The student gets 50 % marks.

Therefore,

$$15 + \frac{1}{3}(x - 20) = 50\% \text{ of } x$$

$$15 + \frac{1}{3}(x - 20) = \frac{50}{100} \times x$$

$$15 + \frac{1}{3}(x - 20) = \frac{x}{2}$$

$$90 + 2(x - 20) = 3x$$

Solving this equation, we get

$$x = 50$$

3. Radha's salary is 50% more than Seeta's salary. Radha got a raise of 40% on her salary while Seeta got a raise of 30% on her salary. By what percent is Radha's salary more than Seeta's?

- (a) **61.53%** (b) 71.64% (c) 86.47% (d) 56.92%

Solution:

Let Seeta's salary be Rs 100

Then Radha's salary = $100 * 50\% + 100 = 150$

Radha got a raise of 40%, then $150 * 40\% + 150 = 210$

Seeta got a raise of 30%, then $100 * 30\% + 100 = 130$

Now Radha's salary is more than Seeta's salary by 80

Percent = $80/130 * 100 = 61.53\%$

4. A number is mistakenly divided by 2 instead of being multiplied by 2. Find the percentage change in the result?

- (a) 35% (b) 45% (c) 65% **(d) 75%**

Solution:

Let the number is N.

2N is the correct outcome.

0.5N is the mistakenly calculated outcome.

Change in the number = $2N - 0.5N$

$$= 1.5N$$

$$\text{Percentage change} = 1.5N * [100/(2N)] = 75\%$$

5. Two students appeared in 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) **42, 33** (c) 41, 32 (d) 43, 34

Solution:

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

6. A reduction in the price of apples enables a person to purchase 3 apples for Re 1 instead of Rs. 1.25. What is the % of reduction in price (approximately)?

- (a) **20%** (b) 25% (c) 30% (d) $33\frac{1}{3}\%$

Solution:

Cost price of 3 apples before reduction = Rs. 1.25

Cost price of 3 apples after reduction = Rs. 1.00

$$\text{Percent reduction in price} = \frac{1.25 - 1.00}{1.25} * 100 = 20\%$$

7. 5% of A's income is equal to 15% of B's income and 10% of B's income is equal to 20% of C's income. If income of C is Rs. 2000, then the total income of A, B and C is:

- (a) Rs.6000 (b) **Rs.18,000** (c) Rs.14,000 (d) Rs.20,000

Solution:

C's income = Rs. 2000

20% of C's income = Rs. 400

10% of B's income = 20% of C's income

or, 10% of B's income = 400

or, B's income = Rs. 4000

15% of B's income = 15% of 4000 = Rs. 600

5% of A's income = 15% of B's income = 600

Thus, A's income = Rs. 12000

Total income of A + B + C = 12000 + 4000 + 2000

= Rs. 18,000

8. The price of a car is Rs. 5,00,000. It was insured for 90% of its price. The car got completely damaged and the insurance company paid only 80% of the insured amount. What is the price of the difference between the price of the car and the amount of insurance received?

- (a) 1,28,000 (b) 1,64,000 (c) 1,60,000 **(d) 1,40,000**

Solution:

Total value = 100% = 5,00,000

Insurance received (B) = 80% of insured amount

⇒ 80% of 90%

⇒ $(80 \times 90 / 100) \% = 72\%$

Price of the car (A) = 100%

Difference% of A – B = 28%

Difference amount = 28% = x

100% = 5,00,000

By Cross multiplication, $x = (28 \times 5,00,000) / 100 = \text{Rs. } 1,40,000$

9. In a college election between 2 students, 10% of the votes cast is invalid. The winner gets 70% of the valid votes and defeats the loser by 1800 votes. How many votes were cast in total?

- (a) 4300 **(b) 5000** (c) 5400 (d) 6600

Solution:

Total votes cast = 100%

Invalid votes = 10%

$$\text{Valid votes} = 100 - 10 = 90\%$$

$$\text{Winner gets} = 70\% \text{ of } 90\%$$

$$\Rightarrow (70 * 90)/100\% = 63\%$$

$$\text{Loser gets} = \text{Valid votes} - \text{Winner votes}$$

$$\Rightarrow 90\% - 63\% = 27\%$$

$$\text{Majority} = \text{Votes secured by winner} - \text{Votes secured by loser}$$

$$\Rightarrow 63\% - 27\% = 36\% = 1800$$

$$\text{Total votes cast} = 100\% = x$$

$$\text{By Cross multiplication, } x = (100 * 1800)/36 = 5000 \text{ votes}$$

Similarly, we can also find out the number of valid votes cast, since we have the value of one percentage.

10. The prices of two articles are in the ratio 3: 4. If the price of the first article be increased by 10% and that of the second by Rs. 4, the original ratio remains the same. The original price of the second article is:

- (a) Rs.40 (b) Rs.35 (c) Rs.10 (d) Rs.30

Solution:

Let the price of two articles are $3x$ and $4x$.

After increment the ratio will be:

$$110\% \text{ of } 3x / (4x+4) = 3/4$$

$$x=10$$

Thus the CP of second article = $4x = 4*10 = \text{Rs. } 40$.

11. A vendor sells 50 percent of apples he had and throws away 20 percent of the remainder. Next day he sells 60 percent of the remainder and throws away the rest. What percent of his apples does the vendor throw?

- (a) 20% (b) 22% (c) 24% (d) 26%

Solution:

Let total apples be 100

$$\text{First day he throws} = 50*20/100 = 10 \text{ apples}$$

Next day he throws = $40 \times 40 / 100 = 16$ apples

So, total = 26

12. A company produced 900 pieces of transistors out of which 15% were defective and out of the remaining, 20 % were not sold. Find out the number of transistors sold.

- (a) 610 (b) 611 (c) **612** (d) 614

Solution:

No of transistor sold = $900 \times (85/100) \times (80/100) = 612$

13. A, B and C participated in a burger eating competition. A beat C by 18 burgers. A also beat B by eating 50% more burgers than B. B had eaten 5 percentage points more burgers than C. Find the overall number of burgers that were eaten?

- (a) **90** (b) 81 (c) 72 (d) 100

Solution:

Let the burgers eaten by C be $x\%$

→ Burgers eaten by B = $x + 5\%$

Since A ate 50% more than B = $(x + 5\%) + 50\%$ of $(x+5\%) = 1.5 (x+5\%)$

→ $x + x + 5 + 1.5(x + 5) = 100\%$

→ $x = 87.5/3.5 = 25$

Therefore, A beat C by 20 percentage points $\Rightarrow 18 \Rightarrow$ Total burgers = $18 \times 100/20 = 90$

The overall number of burgers that were eaten is 90.

14. Traders A and B buy two goods for Rs. 1000 and Rs. 2000 respectively. Trader A marks his goods up by $x\%$, while trader B marks his goods up by $2x\%$ and offers a discount of $x\%$. If both make the same non-zero profit, find x ?

- (a) 12.5% (b) **25%** (c) 37.5% (d) 40%

Solution:

SP of trader A = $1000 (1 + x)$.

Profit of trader A = $1000 (1 + x) - 1000$.

MP of trader B = $2000 (1 + 2x)$.

SP of trader B = $2000 (1 + 2x) (1 - x)$.

$$\text{Profit of trader B} = 2000(1 + 2x)(1 - x) - 2000.$$

$$\text{Both make the same profit} \Rightarrow 1000(1 + x) - 1000 = 2000(1 + 2x)(1 - x) - 2000$$

$$1000x = 2000 - 4000x^2 + 4000x - 2000x - 2000$$

$$4000x^2 - 1000x = 0$$

$$1000x(4x - 1) = 0$$

$$x = 25\%$$

15. 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

Solution:

Percent of students failing quants = 35

Percent of students failing verbal = 42

$$\text{Sum} = 35 + 42 = 77$$

Percent of students failing both = 14

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

$$37\% \text{ of } x = 222$$

$$x = 600$$

HOME WORK

16. In a local election, 2400 people were to vote for Party A or Party B. Party A was bound to win the election. However, on Election Day, 33% of the voters of Party A were kidnapped. Party B was also able to influence the remaining Party A voters and thus double the strength of its voters. In this way, Party A lost by a majority which was half of that by which it would have won had the elections been fair. How many people finally voted for Party A and Party B?

- (a) 600(A), 1200(B) (b) 300(A), 600(B)
(c) 450(A), 900(B) (b) 600(A), 900(B)

Solution:

Easiest way to solve this question is through options

Option a) If 600 voted for A and 1200 voted for B then

Before influencing, $A = 600 + 600 = 1200$, $B = 1200 - 600 = 600$ (As half of B's vote were through influencing)

Before kidnapping, $A = 1200 + \frac{1}{3} \times 1200 = 1600$ (As $\frac{1}{3}$ of A's voters were kidnapped which is half of the $\frac{2}{3}$ that remained)

Thus, total voter initially = $1600 (A) + 600 (B) = 2200$

Thus option a) fits the scenario given in the question completely.

600 would have voted for Party A, 1200 would have voted for Party B.

Hence, the answer is 600(A), 1200(B)

17. In a group of 80 children and 10 youngsters, each child got sweets that are 15% of the total number of children and each youngster got sweets that are 25% of the total number of children. How many sweets were there?

- (a) 1160 (b) 1100 (c) 1080 (d) 1210

Solution:

Number of sweets each child got = 15% of 80 = $\frac{15}{100} \times 80 = 12$.

Number of sweets 80 children got = $80 \times 12 = 960$.

Number of sweets each youngster got = 25% of 80 = $\frac{25}{100} \times 80 = 20$.

Number of sweets 10 youngsters got = $10 \times 20 = 200$.

Total number of sweets = $960 + 200 = 1160$.

18. 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%

Solution:

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

$$\text{Increase}\% = \left(\frac{87500}{75000} \times 100 \right) \% = 50\%$$

$$\therefore \text{Required average} = \frac{15}{10} \% = 5\%$$

19. 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 : 1 (b) 1 : 2 (c) 1 : 1 (d) 4 : 3

Solution:

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

$$(5A/100) + (4B/100) = (2/3)((6A/100) + (8B/100))$$

$$\Rightarrow 5A + 4B = (2/3)(6A + 8B)$$

$$\Rightarrow 15A + 12B = 12A + 16B$$

$$\Rightarrow 3A = 4B$$

$$\Rightarrow A/B = 4/3$$

$$\Rightarrow A:B = 4:3$$

20. At the end of year 1998, a shepherd bought nine dozen goats. Henceforth, every year he added p% of the goats at the beginning of the year and sold q% of the goats at the end of the year where p>0 and q>0. If the shepherd had nine dozen goats at the end of year 2002, after making the sales for that year, which of the following is true?

- (a) p = q (b) p < q (c) p > q (d) p = q/2

Solution:

If p = q

$$\left(\frac{1+p}{100} \right) \left(\frac{1-q}{100} \right) < 9 \text{ doz}$$

Hence, for the final value to be equal to the original value, p should be greater than q. For example, Let p = q = 20 and original number be 100, then

$$100 \times 1.2 \times 0.8 = 96$$

Hence, it is very clear that for final value to be equal to 100, p should be greater than q .