

NTS GAT General Past Papers Questions

Quantitative – Exam No. 25A

Percentage Problems

Prepared by: GAT Online Tutor

Formulas:

1. Profit percentage:

If selling cost is higher than purchasing cost, then we will have profit.

Following formula will be used for profit percentage:

$$\text{Percentage profit} = \frac{\text{Selling cost} - \text{Purchasing cost}}{\text{Purchasing cost}} \times 100$$

$$\text{Percentage profit} = \frac{\text{Amount of profit}}{\text{Purchasing cost}} \times 100$$

2. Amount of profit:

$$\text{Amount of profit} = \frac{\text{Profit percentage}}{100} \times \text{Purchasing cost}$$

3. Loss percentage:

If selling cost is lower than purchasing cost, then we will have loss. Following formula will be used for loss percentage:

$$\text{Percentage loss} = \frac{\text{Purchasing cost} - \text{Selling cost}}{\text{Purchasing cost}} \times 100$$

$$\text{Percentage loss} = \frac{\text{Amount of loss}}{\text{Purchasing cost}} \times 100$$

4. Amount of loss:

$$\text{Amount of loss} = \frac{\text{Loss percentage}}{100} \times \text{Purchasing cost}$$

5. Percentage increase in value:

$$\text{Percentage increase} = \frac{\text{Final value} - \text{Initial value}}{\text{Initial value}} \times 100$$

6. Percentage decrease in value:

$$\text{Percentage decrease} = \frac{\text{Initial value} - \text{Final value}}{\text{Initial value}} \times 100$$

7. Marks percentage:

$$\text{Percentage marks} = \frac{\text{Obtained marks}}{\text{Total marks}} \times 100$$

8. Attendance percentage:

$$\text{Attendance percentage} = \frac{\text{Lectures attended}}{\text{Total number of lectures}} \times 100$$

9. Amount of interest:

$$\text{Interest} = \frac{\text{Interest rate}}{100} \times \text{investment}$$

10. Amount after interest:

$$\text{Total amount} = \text{Investment} + \text{Interest}$$

11. Percentage of votes non-casted:

$$\text{Percentage of votes non_casted} = x = \frac{\text{Votes non_casted}}{\text{Total votes}} \times 100$$

$$\text{Percentage of votes non_casted} = x = \frac{\text{Total votes} - \text{Votes casted}}{\text{Total votes}} \times 100$$

12. Savings percentage:

$$\text{Percentage of savings} = x = \frac{\text{Amount of savings}}{\text{Total income}} \times 100$$

$$\text{Percentage of savings} = x = \frac{\text{Total income} - \text{Expenses}}{\text{Total income}} \times 100$$

13. Single equivalent discount:

$$\text{Single discount} = \left[1 - \left\{ \left(1 - \frac{1^{\text{st}} \text{ discount}}{100} \right) \times \left(1 - \frac{2^{\text{nd}} \text{ discount}}{100} \right) \right\} \right] \times 100$$

The following words are replaced by given symbols in this exam:

Words	Symbols
is	=
what	x
%	$1/100$
of	\times (Multiply)

Exercise:

1. 15 is what % of 15/2? (PP)

Solution:

$$15 = \frac{x}{100} \times \frac{15}{2}$$

$$x = \frac{15 \times 100 \times 2}{15}$$

$$x = 200 \%$$

2. What is 0.1% of 1/5? (PP)

Solution:

$$x = \frac{0.1}{100} \times \frac{1}{5}$$

$$x = \frac{1}{1000} \times \frac{1}{5}$$

$$x = \frac{1}{5000}$$

$$x = 0.0002$$

3. 2 is 10% of what?

Solution:

$$2 = \frac{10}{100} \times x$$

$$x = \frac{2 \times 100}{10}$$

$$x = \frac{200}{10}$$

$$x = 20$$

4. 3 is what % of 6?

Solution:

$$3 = \frac{x}{100} \times 6$$

$$x = \frac{3 \times 100}{6}$$

$$x = \frac{300}{6}$$

$$x = 50 \%$$

5. What % of 24 is 14? (PP)

Solution:

$$\frac{x}{100} \times 24 = 14$$

$$x = \frac{14 \times 100}{24}$$

$$x = \frac{1400}{24}$$

$$x = \frac{175}{3} \%$$

6. $4\frac{1}{6}\%$ of what is 45? (PP)

Solution:

$$4\frac{1}{6} \times \frac{x}{100} = 45$$

$$\frac{25}{6} \times \frac{x}{100} = 45$$

$$\frac{25}{6 \times 100} \times x = 45$$

$$\frac{25}{600} \times x = 45$$

$$\frac{1}{24} \times x = 45$$

$$x = 45 \times 24$$

$$x = 1,080$$

7. What is 15% of 100?

Solution:

$$x = \frac{15}{100} \times 100$$

$$x = 15$$

8. What is $12\frac{1}{2}\%$ of 96? (PP)

Solution:

$$x = \frac{12\frac{1}{2}}{100} \times 96$$

$$x = \frac{25}{2 \times 100} \times 96$$

$$x = \frac{2400}{200}$$

$$x = 12$$

9. 12 is $\frac{1}{3}\%$ of what? (PP)

Solution:

$$12 = \frac{1/3}{100} \times x$$

$$12 = \frac{1}{300} \times x$$

$$x = \frac{12 \times 300}{1}$$

$$x = 3,600$$

10. What is $\frac{1}{1.01}$ of 1,111? (PP)

Solution:

$$x = \frac{1}{1.01} \times 1,111$$

$$x = \frac{1}{101/100} \times 1,111$$

$$x = \frac{1 \times 100}{101} \times 1,111$$

$$x = \frac{1 \times 100}{1} \times 11$$

$$x = 100 \times 11$$

$$x = 1,100$$

11. 14 is $\frac{2}{3}$ of what number? (PP)

Solution:

$$14 = \frac{2}{3} \times x$$

$$x = \frac{14 \times 3}{2}$$

$$x = 7 \times 3$$

$$x = 21$$

12. What is 20% of 30% of 40? (PP)

Solution:

$$x = \frac{20}{100} \times \frac{30}{100} \times 40$$

$$x = \frac{2 \times 3 \times 4}{10}$$

$$x = \frac{24}{10}$$

$$x = 2.4$$

13. What is 20% of 50% of 75% of 70? (PP)

Solution:

$$x = \frac{20}{100} \times \frac{50}{100} \times \frac{75}{100} \times 70$$

$$x = \frac{2 \times 5 \times 75 \times 70}{100 \times 100}$$

$$x = \frac{10 \times 75 \times 70}{100 \times 100}$$

$$x = \frac{75 \times 7}{100}$$

$$x = \frac{525}{100}$$

$$x = 5.25$$

14. If 75% of a number is added in 75, the result is the same number. Find the number? (PP)

Solution:

$$\frac{75}{100} \times x + 75 = x$$

$$0.75x + 75 = x$$

$$75 = x - 0.75x$$

$$75 = 0.25x$$

$$x = \frac{75}{0.25}$$

$$x = \frac{7500}{25}$$

$$x = 300$$

15. If 80% of x is 50% of y and y is 20% of z, then what is x in terms of z? (PP)

Solution:

$$\frac{80}{100} \times x = \frac{50}{100} \times y \dots (1)$$

$$y = \frac{20}{100} \times z \dots (2)$$

Put the value of y from equation (2) in equation (1), we get:

$$\frac{80}{100} \times x = \frac{50}{100} \times \frac{20}{100} \times z$$

$$x = \frac{50}{100} \times \frac{20}{100} \times z \times \frac{100}{80}$$

$$x = \frac{100,000}{800,000} \times z$$

$$x = \frac{1}{8} \times z = \frac{z}{8}$$

$$x = 0.125z$$

16.If 0.12% bulbs are defected, then how many bulbs are defected from a lot of 10,000? (PP)

Solution:

$$\text{Defected bulbs} = 0.12\% \times 10,000$$

$$\text{Defected bulbs} = \frac{0.12}{100} \times 10,000$$

$$\text{Defected bulbs} = 0.12 \times 100$$

$$\text{Defected bulbs} = 12$$

17.Ali got 30 marks out of 50 in English. Find the percentage of his marks?

Solution:

$$\text{Percentage marks} = \frac{\text{Obtained marks}}{\text{Total marks}} \times 100$$

$$\text{Percentage marks} = \frac{30}{50} \times 100$$

$$\text{Percentage marks} = \frac{3000}{50}$$

$$\text{Percentage marks} = 60\%$$

18.Simplify in percentage form: 0.6875? (PP)

Solution:

$$0.6875 \times 100 = 68.75 \%$$

19.A person buys sugar worth 400. He sold $\frac{3}{4}$ th part of it at a loss of 10% and sold the remaining sugar at a gain of 10%. Find the overall gain or loss? (PP)

Solution:

$$\text{Amount of loss} = \frac{\text{Loss percentage}}{100} \times \text{Purchasing cost}$$

The amount of loss for $\frac{3}{4}$ th part of sugar is:

$$\text{Amount of loss} = \frac{\text{Loss percentage}}{100} \times \frac{3}{4} (\text{Purchasing cost})$$

$$\text{Amount of loss} = \frac{10}{100} \times \frac{3}{4} \times 400$$

$$\text{Amount of loss} = 30 \text{ rupees}$$

$$\text{Amount of profit} = \frac{\text{Profit percentage}}{100} \times \text{Purchasing cost}$$

The amount of profit for remaining part i.e., $\frac{1}{4}$ th part $\left(1 - \frac{3}{4} = \frac{1}{4}\right)$ of sugar is:

$$\text{Amount of profit} = \frac{\text{Profit percentage}}{100} \times \frac{1}{4} (\text{Purchasing cost})$$

$$\text{Amount of profit} = \frac{10}{100} \times \frac{1}{4} \times 400$$

$$\text{Amount of profit} = 10 \text{ rupees}$$

$$\text{Overall gain or loss} = \text{Loss} + \text{Profit}$$

$$\text{Overall gain or loss} = -30 + 10$$

$$\text{Overall gain or loss} = -20$$

As the answer is in negative sign, it means we are in loss of 20 rupees.

$$\text{Overall loss} = 20 \text{ rupees}$$

20. Waqas buys a bicycle of Rs. 1400 and sells it in Rs. 2100. Find the percentage of his profit?

Solution:

$$\text{Profit percentage} = \frac{\text{Selling cost} - \text{Purchasing cost}}{\text{Purchasing cost}} \times 100$$

$$\text{Profit percentage} = \frac{2100 - 1400}{1400} \times 100$$

$$\text{Profit percentage} = \frac{700}{1400} \times 100$$

$$\text{Profit percentage} = \frac{1}{2} \times 100$$

$$\text{Profit percentage} = 50 \%$$

21. Sneha eats $\frac{7}{8}$ th portion of her chocolate. How much percentage of chocolate is left?

Solution:

$$\text{Percentage eaten} = \frac{7}{8} \times 100$$

$$\text{Percentage eaten} = 87.5 \%$$

$$\text{Percentage left} = 100 - 87.5$$

$$\text{Percentage left} = 12.5 \%$$

22. If 20% of $a = b$, then what should be the value of $b\%$ of 20?

Solution:

$$\frac{20}{100} \times a = b$$

$$x = \frac{b}{100} \times 20 = ?$$

Put the value of b from first equation into second equation:

$$x = \frac{\frac{20}{100} \times a}{100} \times 20$$

$$x = \frac{20 \times a \times 20}{100 \times 100}$$

$$x = \frac{400a}{10000}$$

$$x = \frac{400a}{10000}$$

$$x = \frac{4a}{100}$$

$$x = \frac{4}{100} \times a$$

$$x = 4 \% \times a$$

$$x = 4\% \text{ of } a$$

23.If $a = 4b$, then what % of $2a$ is $2b$? (PP)

Solution:

$$\frac{x}{100} \times 2a = 2b$$

Put the value of a in this equation:

$$\frac{x}{100} \times 2(4b) = 2b$$

$$x = \frac{2b \times 100}{2 \times 4b}$$

$$x = \frac{100}{4}$$

$$x = 25 \%$$

24.A student got 70% attendance is his school. If there were total of 70 lectures, then how many classed did he miss?

Solution:

$$\text{Attendance percentage} = \frac{\text{Lectures attended}}{\text{Total number of lectures}} \times 100$$

$$70 = \frac{\text{Lectures attended}}{70} \times 100$$

$$\text{Lectures attended} = \frac{70 \times 70}{100}$$

$$\text{Lectures attended} = \frac{4900}{100}$$

$$\text{Lectures attended} = 49$$

$$\text{Lectures missed} = 70 - 49$$

$$\text{Lectures missed} = 21$$

25. There are red, yellow, green and pink balls in a basket. 20% of the balls are green. Red and pink balls are equal in number and there are 12 yellow balls. If there are total 50 balls. Find the number of pink balls? (PP)

Solution:

$$\text{Green balls} = \frac{20}{100} \times 50$$

$$\text{Green balls} = 10$$

$$\text{Red and pink balls} = \text{Total balls} - \text{green balls} - \text{yellow balls}$$

$$\text{Red and pink balls} = 50 - 10 - 12$$

$$\text{Red and pink balls} = 28$$

As we have equal number of red and pink balls, so:

$$\text{Pink balls} = \frac{28}{2}$$

$$\text{Pink balls} = 14$$

26. The population of a mini town is 5500. The number of votes casted by men and women were 2987 and 1413. Find the percentage of the votes non-casted?

Solution:

$$\text{Percentage of votes non_casted} = x = \frac{\text{Total votes} - \text{Votes casted}}{\text{Total votes}} \times 100$$

$$x = \frac{5500 - (2987 + 1413)}{5500} \times 100$$

$$x = \frac{5500 - (4400)}{5500} \times 100$$

$$x = \frac{1100}{5500} \times 100$$

$$x = \frac{1}{5} \times 100$$

$$x = 20 \%$$

27. Junaid's income is Rs. 7000 per month. He spends Rs. 5250 on his family and saves the remaining. Find the percentage of savings?

Solution:

$$\text{Percentage of savings} = x = \frac{\text{Total income} - \text{Expenses}}{\text{Total income}} \times 100$$

$$x = \frac{7000 - 5250}{7000} \times 100$$

$$x = \frac{1750}{7000} \times 100$$

$$x = \frac{1}{4} \times 100$$

$$x = 25 \%$$

28. A person invests 3.5 million rupees in bank and receives an annual interest rate of 10%. Find the amount after one year?

Solution:

$$\text{Interest} = \frac{\text{Interest rate}}{100} \times \text{investment}$$

$$\text{Interest} = \frac{10}{100} \times 3,500,000$$

$$\text{Interest} = \frac{1}{10} \times 3,500,000$$

$$\text{Interest} = 350,000 \text{ rupees}$$

Total amount after one year:

$$\text{Total amount} = \text{Investment} + \text{Interest}$$

$$\text{Total amount} = 3,500,000 + 350,000$$

$$\text{Total amount} = 3,850,000 \text{ rupees}$$

$$\text{Total amount} = 3.85 \text{ million}$$

29. A car was bought in 1 million and sold at 0.9 million. Find the percentage of profit or loss?

Solution:

In the present question, the selling cost is lower than purchasing cost, so we will have loss. We know that:

$$\text{Percentage loss} = \frac{\text{Purchasing cost} - \text{Selling cost}}{\text{Purchasing cost}} \times 100$$

$$\text{Percentage loss} = \frac{1,000,000 - 900,000}{1,000,000} \times 100$$

$$\text{Percentage loss} = \frac{100,000}{1,000,000} \times 100$$

$$\text{Percentage loss} = \frac{100,000}{1,000,000} \times 100$$

$$\text{Percentage loss} = \frac{1}{10} \times 100$$

$$\text{Percentage loss} = 10 \%$$

30. School fares rose from 250 to 300. Find the percentage increase? (PP)

Solution:

$$\text{Percentage increase} = \frac{\text{Final value} - \text{Initial value}}{\text{Initial value}} \times 100$$

$$\text{Percentage increase} = \frac{300 - 250}{250} \times 100$$

$$\text{Percentage increase} = \frac{50}{250} \times 100$$

$$\text{Percentage increase} = \frac{1}{5} \times 100$$

$$\text{Percentage increase} = 20 \%$$

31. A lady deposited 50 rupees in her account. She receives a gift (interest) of 12% of her deposited amount. Find her total amount? (PP)

Solution:

$$\text{Interest} = \frac{\text{Interest rate}}{100} \times \text{investment}$$

$$\text{Interest} = \frac{12}{100} \times 50$$

$$\text{Interest} = \frac{3}{25} \times 50$$

$$\text{Interest} = 6 \text{ rupees}$$

Total amount:

$$\text{Total amount} = \text{Investment} + \text{Interest}$$

$$\text{Total amount} = 50 + 6$$

$$\text{Total amount} = 56 \text{ rupees}$$

32. A mobile was sold in 90,000 at a loss of 10%. Find the price of mobile?

Solution:

As mobile was sold at a loss of 10%, so it means 90% (100% – 10%) value of the mobile is 90,000. This 90% is of the original purchasing cost of the mobile. We can write it in equation form as:

$$\frac{90}{100} \times x = 90,000$$

$$x = \frac{90,000 \times 100}{90}$$

$$x = \frac{9,000,000}{90}$$

$$x = 100,000 \text{ rupees}$$

33. $\frac{1}{4}$ of this year's seniors have an average above 90. And $\frac{1}{2}$ of the remaining students have an average between 80 and 90. What part of the senior class has an average below 80? (PP)

Solution:

$$\bar{x}(\text{above } 90) = \frac{1}{4}$$

$$\bar{x}(\text{below } 90) = 1 - \frac{1}{4}$$

$$\bar{x}(\text{below } 90) = \frac{3}{4}$$

$$\bar{x}(\text{between } 80 \text{ and } 90) = \frac{3/4}{2}$$

$$\bar{x}(\text{below } 80) = \frac{3/4}{2}$$

$$\bar{x}(\text{below } 80) = \frac{3}{8}$$

34. Jibran says that $\frac{4}{5}$ students of his class come on foot. The number of students in his class is 40. How many students come on foot? (PP)

Solution:

$$\text{Number of students come on foot} = \frac{4}{5} \times 40$$

$$\text{Number of students come on foot} = 4 \times 8$$

$$\text{Number of students come on foot} = 32$$

35. Find the percentage increase when a value is increased from 400 to 500? (PP)

Solution:

$$\text{Percentage increase} = \frac{\text{Final value} - \text{Initial value}}{\text{Initial value}} \times 100$$

$$\text{Percentage increase} = \frac{500 - 400}{400} \times 100$$

$$\text{Percentage increase} = \frac{100}{400} \times 100$$

$$\text{Percentage increase} = 25 \%$$

36. What single discount is equal to two successive discounts of 10% and 15%? (PP)

Solution:

We know that:

$$\text{Single discount} = \left[1 - \left\{ \left(1 - \frac{1^{\text{st}} \text{ discount}}{100} \right) \times \left(1 - \frac{2^{\text{nd}} \text{ discount}}{100} \right) \right\} \right] \times 100$$

$$\text{Single discount} = \left[1 - \left\{ \left(1 - \frac{10}{100} \right) \times \left(1 - \frac{15}{100} \right) \right\} \right] \times 100$$

$$\text{Single discount} = [1 - \{(1 - 0.1) \times (1 - 0.15)\}] \times 100$$

$$\text{Single discount} = [1 - \{(0.9) \times (0.85)\}] \times 100$$

$$\text{Single discount} = [1 - \{0.765\}] \times 100$$

$$\text{Single discount} = [0.235] \times 100$$

$$\text{Single discount} = 23.5 \%$$

37. What single discount is equal to two successive discounts of 20% and 30%?

Solution:

We know that:

$$\text{Single discount} = \left[1 - \left\{ \left(1 - \frac{1^{\text{st}} \text{ discount}}{100} \right) \times \left(1 - \frac{2^{\text{nd}} \text{ discount}}{100} \right) \right\} \right] \times 100$$

$$\text{Single discount} = \left[1 - \left\{ \left(1 - \frac{20}{100} \right) \times \left(1 - \frac{30}{100} \right) \right\} \right] \times 100$$

$$\text{Single discount} = [1 - \{(1 - 0.2) \times (1 - 0.3)\}] \times 100$$

$$\text{Single discount} = [1 - \{(0.8) \times (0.7)\}] \times 100$$

$$\text{Single discount} = [1 - \{0.56\}] \times 100$$

$$\text{Single discount} = [0.44] \times 100$$

$$\text{Single discount} = 44 \%$$