# Percentage & Profit Loss.

1) What is 25% of 200?

→ $\frac{25}{100} \times 200 = 50$

ans = (b) 50

2) If 40% of number is 80, what is the number?

→ $\frac{40}{100} \times x = 80$

$x = \frac{80 \times 100}{40} = 200$

ans = (c) 200

3) 75% of a number is 150, what is the number?

→ $\frac{75}{100} \times x = 150$

$x = \frac{150 \times 100}{75} = 200$

ans = (b) 200

4) What is 15% of 120

→ $\frac{15}{100} \times 120 = 18$

ans = (c) 18

5) If 30% of a number is 90, the the number.

→ $\frac{30}{100} x = 90$

$x = \frac{90 \times 100}{30} = 300$

ans = (c) 300

6) The price of a product increases from ₹ 200 to ₹ 250. What is the percentage increase.

→

· $\frac{\text{initial price} - \text{original price}}{\text{original price}} \times 100$

$\frac{250 - 200}{200} \times 100$

$\frac{50}{200} \times 100 = 50$

$\frac{50}{200} \times 100$

ans = 25%

7) A salary ↑ from ₹ 40,000 to ₹ 50,000. What is the percentage increase

→ $\frac{\text{new price} - \text{old}}{\text{old price}} \times 100$

$\frac{50,000 - 40,000}{40,000} \times 100 \Rightarrow \frac{10,000}{400} \Rightarrow \frac{100}{4}$

ans (b) = 25%.

8) The population of a town decreased from 10,000 to 8,000. What is the % decrease?

→ $\frac{\text{old value} - \text{new value}}{\text{old value}} \times 100$

$\frac{10,000 - 8,000}{10,000} \times 100$

$\frac{2000}{10,000} \times 100$

ans = 20%

9) A book's price drops from ₹ 500 to 400. What is the % decrease?

→ $\frac{\text{old value} - \text{new value}}{\text{old value}} \times 100$

$\frac{500 - 400}{500} \times 100 \Rightarrow \frac{100}{5}$

ans = (c) 20%

10) If the cost price of an item is ₹ 600 & the selling price is ₹ 450, what is the % loss?

⇒ % loss = $\frac{\text{loss}}{\text{C.P}} \times 100$

$= \frac{600 - 450}{600} \times 100 \Rightarrow \frac{150}{6}$

ans = 25%

## * Percentage Comparision

11) Which is greater: 30% of 40 or 40% of 30

→ both are equal.

12) A person spends 60% of his income & save ₹ 8,000. What is his total income.

→ total income = 100%

40% saving.

$$40\% \text{ of } x = 8000$$

$$\frac{40}{100} \times x = 8000$$

$$x = \frac{8000 \times 100}{40}$$

$$\boxed{x = 20,000}$$

13) If A is 20% more than B, then B is how much less than A?

→ let B = 100

A = 120 ← 20%

$$B = \frac{120 - 100}{120} \times 100$$

$$= \frac{20}{120} \times 100$$

$$= \frac{200}{12}$$

$$\boxed{\text{ans} = 16.66\%}$$

f 300

14) If the price of sugar is increased by 25%, by how much should the consumption be reduced to maintain the same expense?

→

100% + 25% = 125%  y% = ?

25% of 125 = ?

$y = \frac{25}{125} \times 100$

$y = 20\%$

15) If A's income is 40% more than B's income, then B's income is what percentage less than A's?

→

A = 140%

$B = \frac{140 - 100}{140} \times 100$

$B = \frac{40}{14} \times 10^5 = \frac{200}{7} = 28.57$

Ans = 28.57%

16) The price of an item is increased by 20% & then decreased by 10%. What is the net percentage change.

→ 120% ↓

10% = $120 \times \left(1 - \frac{10}{100}\right) = 108$

$= \frac{108 - 100}{108} \times 100$

= 8%

17) A number is increased by 30% & then decreased by 20%. what is the final percentage change

→ $x - 130$

$130\left(1 - \frac{20}{100}\right) \Rightarrow 130\left(1 - \frac{1}{50}\right) \Rightarrow 130\left(\frac{130-130}{50}\right) \Rightarrow \frac{130 \times 49}{50}$

$130 - 26 = 104$

$\frac{104 - 100}{100} \times 100 = \frac{4}{100} \times 100$

ans = 4% increase

18) If the population of a city increased by 25% & then decreased by 20% what is the net percentage change?

→ $x = 125$ ← increased

decrease $= 120 \left(\frac{-10}{100}\right) 20$ $120\left(1 - \frac{20}{100}\right) \Rightarrow 120\left(1 - \frac{1}{5}\right)$

$\left(120 - \frac{120}{50}\right) = \frac{120 \times 50 - 120}{50} = \frac{100}{}$

inital & final population are same

ans = 0 %

19) If a price increase by 40% & then decreases by 30%. the final change is.

→ increased = 140

decrease = 140 − (30% of 140)

$= 140 - \left(\frac{30}{100} \times 140\right) = 98$

$\% = \frac{140 - 98}{140} \times 100 \Rightarrow \frac{42}{140} \times 100 = 30$

final = 98%

ans = 2% decrease

20) The salary of a person is first increased by 20% & then decreased by 10%. what is the overall percentage change?

→ increased = 120.

decreased = $120 - (10\% \text{ of } 120) \Rightarrow 120 - \left(\frac{10}{100} \times 120\right)$.

$\Rightarrow 120 - 12 = 108$.

Final value.

Final value is increas by 8 of original value (100).

∴ ans = 8% increase

21) If an article is sold at a profit of 25%, then the selling price is what percentage of the cost price.

→ SP = CP + 25% of CP

SP = 100 + 25 = 125

SP as % of CP

$\frac{SP}{CP} \times 100 \Rightarrow \frac{125}{100} \times 100 \Rightarrow 125$.

ans = (b) 125 %

22) A shopkeeper allow a discount of 10% on the marked price & still makes a profit of 8%. If the marked price is ₹500, what is the cost price.

→ MP = 500, Dis = 10%, P = 8%, CP = ?

SP = MP − (10% of MP)

$= 500 - \left(\frac{10}{100} \times 500\right) \Rightarrow 500 - 50 = 450$.

SP = CP + 8% of CP

$450 = CP \times \left(1 + \frac{8}{100}\right) \Rightarrow 450 = CP \times 1.08 \Rightarrow CP = \frac{450}{1.08}$

CP = 416.67.

23) If the profit is 20% of the cost price, then what is the profit percentage on the selling price?

→ Profit $= \frac{20}{100} \times CP = 0.2\,CP$.

$SP = CP + \text{Profit} \Rightarrow 1\,CP + 0.2\,CP \Rightarrow 1.2\,CP$.

% of P on SP $= \left(\frac{\text{Profit}}{SP} \times 100\right)$.

$= \frac{0.2\,CP}{1.2\,CP} \times 100 = \frac{2}{12} \times 100 =$ **16.67%**

24) A product is marked at ₹ 1,200 & sold for ₹ 960. What is the percentage discount given?

→ Discount $= 1200 - 960 \Rightarrow 240$.

Discount % $= \frac{\text{Discount}}{MP} \times 100 \Rightarrow$

$= \frac{240}{1200} \times 100$

**Discount % = 20 %**

25) If an article is bought for ₹ 500 & sold for ₹ 650, what is the % profit?

→ CP = 500, SP = 650

Profit = SP − CP = 650 − 500 = 150

Profit % $= \frac{\text{Profit}}{C.P} \times 100$

$= \frac{150}{500} \times 100$

**Profit = 30 %**

26) If A's income is 20% more than B's income is what percentage less than A's ?

→ A = 120.

percentage decrease = $\frac{\text{diff}^n}{A} \times 100 \Rightarrow \frac{120-100}{120} \times 100$

$= \frac{20}{120} \times 100$

% decrease = 16.67% .

27) If the ratio of boys to girls in a school is 3:2, what percentage of the total students are boys.

→ Total = 3+2 = 5

percentage of boys = $\frac{\text{boys part}}{\text{Total}} \times 100$

$= \frac{3}{5} \times 100$

% of boys = 60% .

28) A city's population increased from 2,00,000 to 2,50,000 in 2 years what is the percentage increase.

→ % = $\frac{\text{final} - \text{old}}{\text{old}} \times 100$

$= \frac{250,000 - 2,00,000}{250,000} \times 100$

$= \frac{50,000}{250,000} \times 100$

% = 25%

29) In a election, a candidate gets 65% of the total votes & wins by 3000 votes. How many total votes were cast?

→ Candidate win = 65% then losing = 35%

Votes secured by winning candidate − Votes secured = 3000

65% of x − 35% of x = 3000

$\frac{65}{100}x - \frac{35}{100}x = 3000$

$\frac{30}{100}x = 3000$

$x = \frac{3000 \times 100}{30} = 10,000$

[ x = 10,000 ]

30) The price of an article is reduced by 30%. By what percentage must the new price be increased to restore the original price?

→ x = 100 − 30 = 70.

% increased = $\frac{100-70}{70} \times 100$

$= \frac{30}{70} \times 100$

[ b = 42.85% ]

31) → If a no. is increased by 50% & then decreased by 50%

increased = 150

decrease = $150 - \left(\frac{50}{100} \times 150\right) \rightarrow 150 - 75$

= 75

Net change = $\frac{\text{Final value} - \text{original value}}{\text{original value}} \times 100$

$= \frac{75 - 100}{100} \times 100$

Net change = 25 %

32) if A is 20% taller then B is shorter than A by.

→ Assume B = 100.

A = 120.

% decrease $= \frac{120 - 100}{120} \times 100$

$= \frac{20}{120} \times 100 \Rightarrow \frac{2000}{120} = 16.67$

% decrease = 16.67

33) if 30% of a number is 90, what is 60% of the same no.

→ 30% of x = 90

$\frac{30}{100} x = 90$

$x = \frac{90 \times 100}{30} \Rightarrow 300$

60% of 300 =

$\frac{60}{100} \times 300$

$= \frac{18000}{100} = 180$

∴ = 180.

34) A person spends 75% of his income & saves ₹ 5000. what is total income.

→ saving = 75% − 100 ⇒ 25%.

25% of x = 5000

$\frac{25}{100}x = 5000 \Rightarrow x = \frac{5000 \times 100}{25}$

$\boxed{x = 20000}$

35) The price of petrol increased by 20%. By what percentage should consumption be reduced to maintain the same expense?

→ increased 20% = 120.

~~20% of 120~~

$= \frac{20}{120} \times 100$

$\boxed{\text{reduce} = 16.67\%}$

36) The price a TV was first increased by 20% & then decreased by 10%. what is the overall percentage change?

→ increased = 120.

decreased = $120 - (20\% \text{ of } 120) \Rightarrow 120 - \left(\frac{20}{100} \times 120\right) = 108$

overall change = $\frac{\text{final} - \text{old}}{\text{old}} \times 100$

$= \frac{108 - 100}{100} \times 100$

$\boxed{\text{overall change} = 8\%}$

97) A Shopkeeper marks an item 25% above the cost price & gives a 20% discount. what is the profit / loss percentage.

→ M.P = 125.

S.P = 20% of 125 ⇒ $\frac{20}{100} \times 125 \Rightarrow 100$.

Profit / loss = SP − CP ⇒ 100 − 100 = 0.

98) If the cost price of an article is ₹ 500 & it is sold at loss of 20% what is the selling price

→ C.P = 500.

Loss = 20% of CP.

$\text{Loss} = \frac{20}{100} \times 500 = 100$.

S.P = CP − loss ⇒ 500 − 100 = 400.

99) If a salary increased by 10% & then decreased by 10% what is the final percentage change?

→ increased = 110.

decreased = $110 - \left(\frac{10}{100} \times 110\right) = 99$.

overall change = $\frac{99 - 100}{100} \times 100$

$= \frac{-1}{100} \times 100 = -1\%$.

overall change = 1% ↓

40) A student needs 40% marks to pass. He get 200 marks & fails by 20 marks. What are the total mark

→ Passing mark
M. obtained + needed pass = 200 + 20 = 200

Let total mark x

~~x %~~ of 40 % of x = 220

$\frac{40}{100} \times x = 220$

$x = \frac{220 \times 100}{40}$

$\boxed{x = 550}$

41) A man spends 20% of his salary on rent, 30% on food, & 10% on transport. If he save ₹ 18000 what is his salary?

→ Total expenditure = 20% x + 30% x + 10 x

= 60% x.

$= \frac{60}{100} \times x = 0.60x$

remaining salary = 60 - 100 = 40%.

40% x = 18,000.

$\frac{40}{100} \times x = 1800 \rightarrow x = \frac{1800 \times 100}{40}$

$\boxed{x = 45,000}$

42)

→ Increased 30% = 130.

decreased 30% = $130 - \left(\frac{30}{100} \times 130\right) \Rightarrow 91$

Change = $\frac{\text{final} - \text{old}}{\text{old}} \times 100 \Rightarrow \frac{91 - 100}{100} \times 100.$

$\boxed{\text{Change} = -9\ \%}$

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43) The population of a town increased by 10% every year. If the current population is 10,000 what will it be after 3 year.

→ 1 year = $1000 \times 1.10$
= 11000.

2 year = $11000 \times 1.10$
= 12100.

3 year = $12100 \times 1.10$
= 13310.

44) If 15% of A is equal to 20% of B. then A:B is.

→ $\frac{15}{100} \times A = \frac{20}{100} \times B$

$15A = 20B$

$\frac{A}{B} = \frac{20}{15} \Rightarrow \frac{4}{3} \Rightarrow$ **A:B = 4:3**

45) If the C.P of an item is ₹ 800 & profit made is 25%. What is S.P ?

→ CP = 800, profit = 25% of CP

profit = $\frac{25}{100} \times 800 \Rightarrow 200$.

SP = CP + Profit
= 800 + 200
**S.P = 1000**

46)
→ C.P = 200 profit = ?
S.P = 250
S.P = C.P − profit
250 = 200 − profit
profit = 250 − 200
profit = 50

47)
→ S.P = 720
profit = 20 % of SP
CP = ?
profit = $\frac{20}{100} \times 720 = 1.20$.

S.P = CP − profit
720 = CP − 1.20
$\frac{720}{1.20}$ = CP ⇒ CP = 600

48)
→ C.P = 500
loss − 15 % of CP
$\frac{15}{100} \times 500 \Rightarrow 75$

S.P = CP ± profit − loss
S.P = 500 − 75
S.P = 425

S.P = 425

49)
→ C.P
loss

S.P

S.P

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49)

→ C.P = 1500

Loss = 10% of CP

$= \frac{10}{100} \times 1500 = 150.$

SP = CP − loss.

= 1500 − 150.

**S.P = 1350**

50) MP = 30% CP.

$MP = CP\left(1 + \frac{30}{100}\right) = CP \times 1.30$

Discound = 10% MP

$= MP \times \left(1 - \frac{10}{100}\right) = MP \times 0.90$

S.P = (CP × 1.30) × 0.90

S.P = C.P × 1.17

Profit % = SP − CP.

= (C.P × 1.17) − CP ⇒ CP(1.17 − 1)

= C.P × 0.17

$= \frac{\text{Profit}}{CP} \times 100$

$\frac{CP \times 0.17 \times 100}{CP}$

**Profit = 17 %**