22/4/21

Percentages (Quantitative Aptitude)

* percent → per hundred (Represented as %).

Ex: $25\% = \frac{25}{100} = \frac{1}{4}$

Ex: 1) Shyam Obtained 325 marks out of 400. His percentage is $= \frac{325}{400} \times 100 = \underline{81.25\%}$

2) A student scored 65% marks. Total marks were 500.

His score is = 65% of 500 $= \frac{65}{100} \times 500 = \underline{325 \text{ marks}}$.

19) The height of Amitabh 2 yrs ago was 110cm. Now his height is 120cm. Find percentage change in his height.

A: Let current height = h

$\Rightarrow$ % change in height $= \frac{120-110}{110} \times 100$

$= \frac{10}{110} \times 100 = \underline{9.09\%}$.

28) The salary of Raja is ₹. 9000 per month, salary of Rani is ₹. 10000 per month.

a) what percent is salary of Rani that of Raja?

b) what percent is salary of Raja to that of Rani?

A: a) Salary of Rani to Raja

$= \frac{10000}{9000} \times 100$

$= \underline{111.11\%}$

b) Salary of Raja to Rani

$= \frac{9000}{10000} \times 100 = \underline{90\%}$.

9) Ashwin got an increment of 25% on his salary. By what percentage should his salary be decreased to obtain previous salary?

A: Let Ashwin's original salary = "x".

Salary after incrementing 25%

$$\Rightarrow p = x + \frac{25}{100} \times x = \boxed{x + \frac{x}{4}}$$

$\Rightarrow$ To obtain previous salary 'x' again

$$x = p - p \times \frac{z}{100} \quad \text{(let some z\% must be decreased)}$$

$$x = x + \frac{x}{4} - \left[x + \frac{x}{4}\right]\frac{z}{100}$$

$$\Rightarrow \frac{x}{4} = \frac{5x}{4}\frac{z}{100}$$

$$\Rightarrow z = \frac{100}{5} = \boxed{20\%}$$

$\therefore$ His salary should be decremented by 20% to obtain previous salary.

Shortcut: $x \uparrow \longrightarrow$ decrease %

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

i.e, $= \left(\frac{25}{100+25}\right) \times 100 = \frac{1}{5} \times 100$

$= \boxed{20\%}$

* percentage increase and percentage decrease:

Ex: price of product changed from

A —— Increased by 33.33% —— B
x (400)

find x?

$\Rightarrow$ 33.33% = 1/3

$\Rightarrow 1 + \frac{1}{3} = \frac{4}{3}$

$\Rightarrow x \times \frac{4}{3} = 400$

$\Rightarrow x = 300$ $\Rightarrow$ original price.

Similarly,

if A —— decreased by 33.33% —— B
x (300)

$\Rightarrow$ 33.33% = 1/3

$\Rightarrow 1 - 1/3 = 2/3$

$\Rightarrow \frac{2}{3} \times x = 300$

$\Rightarrow x = 450$ (original price).

Q) $x \xrightarrow{+40\% \uparrow} 280$

$\Rightarrow x + x \times \frac{40}{100} = 280$

$\Rightarrow x + \frac{2}{5}x = 280$

$\frac{7}{5}x = \frac{280}{40} \times 5$

$x = 200$

(or) $x \times \frac{140}{100} = 280$

$\rightarrow$ (i.e ↑ by 40%
$= 100 + 40 = 140$)

Q) $x \xrightarrow{-60\% \downarrow} 140$

$x - x \times \frac{60}{100} = 140$

$\Rightarrow x - \frac{3}{5}x = 140$

$2x = 140 \times 5$

$x = 350$

(or) $x \times \frac{40}{100} = 140$

$\rightarrow$ ↓ by 60%.

$\rightarrow 100 - 60 = 40\%$.

$\rightarrow \frac{1}{2} = 50\%$

$\rightarrow \frac{1}{3} = 33.33\%$

$\rightarrow \frac{1}{4} = 25\%$

$\rightarrow \frac{1}{5} = 20\%$

$\rightarrow \frac{1}{6} = 16.66\%$

$\rightarrow \frac{1}{7} = 14.28\%$

$\rightarrow \frac{1}{8} = 12.5\%$

$\rightarrow \frac{1}{9} = 11.11\%$

$\rightarrow \frac{1}{11} = 9.09\%$

$\rightarrow \frac{1}{12} = 8.33\%$

Q) A (x) $\xrightarrow{+33.33\%}$ ◯ $\xrightarrow{+16.66\%}$ (500) find x?

After 1 year — After 1 year again

$\Rightarrow +33.33\% = 1 + \frac{1}{3} = 4/3$

$\Rightarrow +16.66\% = 1 + \frac{1}{6} = \frac{7}{6}$

$\Rightarrow \left(x \times \frac{4}{3}\right) \times \frac{7}{6} = 500$

$\Rightarrow x = \frac{\overset{250}{\cancel{500}} \times \overset{3}{\cancel{6}} \times 3}{\cancel{4} \times 7} = \frac{250 \times 9}{7}$ //.

Shortcut:

$$\%\,Net = p1 + p2 + \frac{p_1 p_2}{100}$$

If % ↑, put "+"
If % ↓ put "−".

Ex: A $\xrightarrow{\uparrow 50\%}$ B $\xrightarrow{\downarrow -30\%}$ C

Net percentage change

$= 50 - 30 - \frac{1500}{100}$

$= +5\%$

i.e, Net increase in 5% of product.