Percentages

for every 100

Ques. 12% of 2400

$$\frac{12}{100} \times 2400 = 288$$

$$\left\{ \begin{array}{l} 10\% \text{ of } 2400 = 240 \\ 1\% \text{ of } 2400 = 24 \end{array} \right\}$$

Ques. what % of 2400 is 12?

$$\frac{x}{100} \times 2400 = 12 \Rightarrow x = 1/2$$

E.g   60 is what % of 100?

$$\text{\%} = \frac{60}{100} \times 100$$

Ques 100 is what % of 60?

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

* **Basic % & equivalent fractions:-**

$100\% = 1$ $50\% = 1/2$ $33.33\% = 1/3$

$25\% = 1/4$ $20\% = 1/5$ $16.66\% = 1/6$

. . . . .

10% of $1240 = \underline{124}$ $\longrightarrow$ 1% of $1240 = 12.4$

place decimal after 2 digits

$\downarrow 19\% = ?$

$(10\% + 9\%)$ of 1240

$(20\% - 1\%)$ of $1240 = (2 \times 124) - 12.4$

$= 248 - 12.4 = 235.6$

Ques E1   A's salary is 50% more than B's salary.

By what % B's salary is less than A's salary?

a) 20%   b) 50%   c) 33.33%   d) None

B's Sal = B   A's salary $= B + \frac{B}{2} = \frac{3B}{2}$ $\longrightarrow$ soln

$\therefore$ % increase in B's salary $= \frac{\frac{3B}{2} - B}{B} \times 100 = \frac{\frac{3B}{2} - B}{\frac{3B}{2}} \times 100$

$$= \frac{100}{3}\%$$

$$\boxed{a\% \text{ of } b = b\% \text{ of } a}$$

eg ① 36% of 1250
     40% - 4%
     = (4×125) - 4×12.5
     = 500 - 50.0 = 450

② 28.56% of 343
     2 * 14.28% of 343
     = 2 * $\frac{1}{7}$ * 343
     = 2 × 49 = 98

③ 316.66% of 480
(300 + 16.66)% of 480
$\left(3 + \frac{1}{6}\right)$ * 480   = 1440 + 480/6 = 1440 + 80
                             = 1520
$\frac{19}{6}$ × $\overset{70}{\cancel{48}}$ = 1330

Sol^n E1   B   A
                100   = 100 + 50 = 150
= $\frac{50}{150}$ × 100
                     diff = 50
= $\frac{100}{3}$%

Formula:- If more % is given & we need to find less % then use $\frac{r\%}{100+r\%}$ × 100.

• If less % is given & more % is to be found then use $\frac{r\%}{100-r\%}$ × 100.

E2   ~~Rohit~~ Arjun   Rohit
             100   133.33%

            $\frac{100}{}$ $\frac{33.33}{100 + 33.33}$ × 100

         = $\frac{\cancel{100}}{}$ = $\frac{33.33}{133.33}$ × 100

         = $\frac{100/3}{4 * 100/3}$ × 100 = $\boxed{25\%}$

Pattern 2 :-

E1   Price of comodity ↑es by 20% and its consumption ↓es by 20%. Find % change in expenditure ?

     a). 20% ↑es   b). 20% ↓es   c) 4% ↑es   d) 4% ↓es.

Price $= 100 + \dfrac{20}{100} \times 100 = 120$

Consumption $= 80 = 100 - \dfrac{20}{100} \times 100$

$\boxed{\text{Expenditure} = \text{Price} \times \text{Consumption}}$

$\qquad = (100 \times 100) = 10000$ ⎤ difference $= 400$

Now $\quad = 120 * 80 = 9600$ ⎦

∴ % change $= \dfrac{400}{10000} \times 100 = \boxed{4\%}$ decrease

$\boxed{\begin{array}{c} \text{Successive Increment} \\ \text{Decrement} \end{array} = x + y + \dfrac{xy}{100}}$

∴ $+20 - 20 - \dfrac{20 * 20}{100} = \boxed{-4\%}$ ∴ 4% decrease

E2 length of a rectangle ↑es by 30% & breadth ↓es by 10%. Find the % in area ?

     a). 17% ↑   b). 27% ↑↓   c). 14% ↑   d). 24% ↓

$A = L * B = 10 * 10$ ⎤
$A' = 7 * 9 = 27$ ⎦ 17%

∴ $\dfrac{17}{100} \times 100 = 17\%$ ↑

Pattern 3:

E1 A person always spends 80% of his income. This month of his salary increased by 20% and his expenditure also increased by 20%, find the % change in his savings?

a). 20%↑   b). 20%↓   c). 4%↑   d). 4%↓

Salary = 100   savings = 20
Now, Salary = 120   Expenditure = $\frac{80 + 20 \times 120}{100}$

$$= \frac{80 + 24 = 104}{96}$$

Savings = 24

∴ % change in savings = $\frac{24-20}{200} \times 100 = $ ⑫%

$$= \frac{4}{20} \times 100 = 20\% \text{ Increase}$$

Ques Find a no. which when increased by 25% three times consecutively becomes 250. ↳ 1/4

∴ $x \times \frac{5}{4} \times \frac{5}{4} \times \frac{5}{4} = 250 \Rightarrow x = 128$

A Remainder Obtained :-

Ques Remainder obtained when 43^4 divided by 6?

a) 6   b) 1   c) 7   d) None of these

$\frac{43}{6} = 1$ ∴ $1 \times 1 \times 1 \times 1 = $ ①

Ques remainder obtained when $19^4 + 7$. div by 90

a). 6   b). 1   c). 8   d). 7

$19^4 + 7 \Rightarrow \frac{(19^2)^2 + 7}{90} \Rightarrow \frac{(361)^2 + 7}{90}$

$$\Rightarrow \frac{1^2 + 7}{90} \Rightarrow 1 + 7 = ⑧$$