Average/Mean

$$\text{Average} = \frac{\text{Sum}}{\text{Total}} \quad \text{—— (1)}$$

$$\Rightarrow \text{Sum} = \text{Avg} \times \text{Total} \quad \text{—— (2)}$$

1. Ali buys three books for Rs. 16 each and four books for Rs. 23 each. What will be the average price of books?

3 Books = 16 X 3 = 48 Rs

\+ 4 Books = 23 X 4 = 92 Rs +

7 ... 140

$$\text{Avg} = \frac{\text{Total Cost}}{\text{Total Books}} = \frac{140}{7} = 20 \text{ Rs.}$$

2. The average weight of a class of 13 students is 14kg. When two more students joined the class, the average rose by 3kg. What is the average weight of the two new students.

13 → Avg = 14kg ⇒ Sum(13) = 13 × 14 = 182kg.

+2

+3

15 → Avg(2) = 17kg ⇒ Sum(15) = 15 × 17 = 255kg

Sum(2 new students) = S(15) − S(13)

= 255 − 182 = 73kg

Avg(3) = $\frac{73}{2}$ = 36.5kg <Ans:

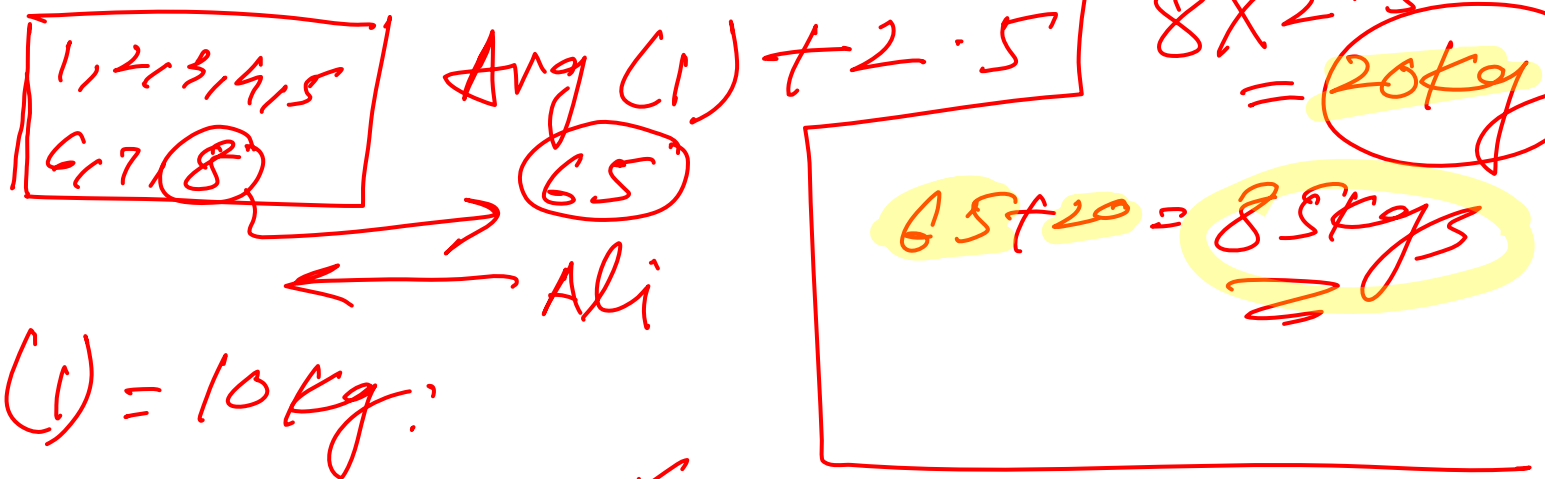
3. The average of 5 numbers is 42. If we include a sixth number 48, then the new average will be?

$$\text{Sum}(5) = 5 \times 42 = 210$$

$$\text{Avg}(\text{new}) = \frac{\text{Sum}(5) + 6\text{th}}{6} = \frac{210 + 48}{6}$$

$$= \frac{258}{6} = 43 \quad \text{Ans:}$$

4. The average of eight students is increases by 2.5kg when a new student comes in place of one of them weighting 65kg. What might be the new student?



let Avg (1) = 10 kg.

Sum(1) = 8 X 10 = 80 kg

Avg(2) ⇒ 10 + 2.5 = $\frac{\text{Sum(1)} - 65 + \text{Ali}}{8}$

⇒ 12.5 = $\frac{80 - 65 + \text{Ali}}{8}$ ⇒ 12.5 X 8 = 15 + Ali

⇒ 100 = 15 + Ali ⇒ Ali = 100 − 15

= 85 kg.

5. The average temperature of a week is 33 degree centigrade, the average temperature of Monday, Tuesday, Wednesday and Thursday is 34 and on Thursday, Friday, Saturday and Sunday is 35, then what is the temperature on Thursday?

Ans = 45°C

H.W

Percentage/Profit/Loss

⇒ (1) Percent = $\frac{\text{Parts}}{100}$ = % = $\frac{1}{100}$

(A) Percentage = $\frac{\text{Result}}{\text{Total}} \times 100$ — (1)

⇒ Percent × Total = Result — (2)

is → Data ⇒ Result

of → Data → Total ∴

Result

a. 144 is what percent of 360? → percent = $\frac{144}{360} \times 100$

?? = 40%

Result

b. 30 is 20% of what number?

Result

c. 77 is what percent of 140?

percent = $\frac{77}{140} \times 100$

= 55% Ans

20% = $\frac{30}{\text{Total}}$

$\frac{20}{100} = \frac{30}{\text{Total}}$

$\text{Total}\left(\frac{20}{100}\right) = 30$

$\text{Total} = \frac{30 \times 100}{20} = 150$ Ans 2

Result

d. 25% of a number is 300. the number is? H.W

H.W

Result

e. what percent is 250gram of 1kg?

1kg = 1000gm

Ans = 25%

x x

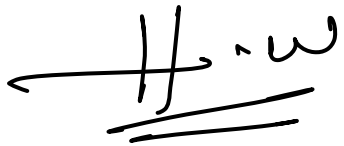
f. Evaluate: 15% of 80% of 90 is?

$$(15\%) \times (80\%) \times (90)$$

$$\frac{\cancel{15}^{3}}{\cancel{100}_{20}} \times \frac{\cancel{80}^{4}}{\cancel{100}} \times \cancel{90} = \frac{3 \times 4 \times 9}{10} = \frac{108}{10}$$

$$= 10.8 \text{ Ans}$$

Three candidates contested an election and received 1000, 5000, 10,000 votes respectively. What is the percentage of the total votes the winning candidates gets?



Case:2

Time frame

New, old ⇒ Tenses ① Past → old

② present → New

① present (old)

② future (New)

Years

① 2015 — New:

② 2010 → old

① percent (↑↓) = $\left(\frac{\text{New} - \text{old}}{\text{old}}\right) \times 100$

??

(i) percent (↑) = Last Result = +ve

i.e = +50%

(ii) percent (↓) = Last Result = −ve

i.e = ⊖30%

↑

Decrease/loss :

1. A man's income is Rs. 8400/day. Given that his original income was Rs. 7500/day, find the percentage increase in his daily income?

New = 8400, old = 7500

$$\text{Percentage} = \left(\frac{\text{New} - \text{old}}{\text{old}}\right) \times 100 \rightarrow$$

$$= \left(\frac{8400 - 7500}{7500}\right) \times 100$$

$$= \frac{900}{7500} \times 100 = \frac{900}{75} = 12\%$$

Ans:

2. A primary school had an enrollment of 850 students in 2020. In 2022, the enrollment was 1120. What was the percentage increase in the enrollment?

3. The enrollment in a certain school was 450 in 2015. By 2016, the enrollment had increased by 16%. What was the enrollment in 2016?

old = 450, New = ? % = 16% ✓

$\Rightarrow 16\% = \frac{New - old}{old} \Rightarrow 16\% = \frac{New - 450}{450}$

$\Rightarrow (16\%)(450) = New - 450$

$\Rightarrow 450 + 16\% \times 450 = New = 450 + 72$

$= 522$ Ans.

Bill = 1000Rs =

10% → Fine!

Case:3
Deduction: Total-%
Increment: Total+%

① More / increase / increment / fine - - - -

⇒ original + x% of original = payment

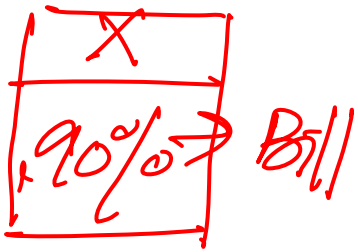
Note = payment > original :

② less / Decrease / Deduction / concession - - - -

original − x% of original = payment

1. If 10% is deducted from a bill, Rs. 585 remains to be paid. How much is the bill?

① Bill − 10% Bill = Payment (585)



Method (1) ⇒

→ 100% Bill

⇒ 90% of Bill = 585

$\frac{90}{100}$ Bill = 585 ⇒ Bill = $\frac{585 \times 10}{9}$

Bill = 650 Ans

$\Rightarrow$ Bill $-$ 10% Bill $=$ 585, let Bill $= x$

$$x - 10\%x = 585$$

$$\Rightarrow x - \frac{10}{100}x = 585$$

$$\frac{x}{1} - \frac{x}{10} = 585$$

$$\frac{10x - x}{10} = 585$$

$$\frac{9x}{10} = 585$$

$$x = \frac{585 \times 10}{9}$$

$$= 650 \text{ Ans}$$

Bill: 650

2

3. During a sale a clerk was putting new price tags on each item. On one sweater, he accidently raised the price by 20% instead of lowering the price by 20%. As a result, the price on the tag was Rs. 80, too high. What was the original price of the sweater? (CSS)

H.W

Ans = 66.66

= 67

2. A boy scored 90 marks for his Math test. This was 20% more than what he had scored for the English test. How much did he score in English?

H.W

Ans: 75

A fruit seller had some items. He sells 40% items and still has 420 items. What is the total number of items he had originally?

H.W

The income of a company decreased by 10% and 15% in two successive years. What is the percentage of decrease in income after two years. (CSS)

H.W

↓ Next Topic

in next class

Ali purchased a cycle for Rs. 25,000/-. He spent Rs. 5000 on its repairs, then sold it for Rs. 33,000. Find his gain in percent.

11 oranges are bought for Rs. 10 and 10 oranges are sold for Rs. 11, find the gain/loss in percent.

SP = List Price –Discount

Discount = List pricexDiscount rate

An article costs Rs. 600. What should be the marked price of the article so that after 10% discount, the trader makes 20% profit?