MATHS

By Priyanshu Shukla Sir For Class 8th

COMPARING QUANTITIES

Topics To Be Covered

1 All Topics in One Short

RATIO

- The ratio is used to compare two quantities. These quantities must have the same units. The ratio of two quantities of the same kind and in the same unit is the fraction that one quantity is of the other.

$a:b$

Example: Find the ratio of the following :

3 km to 300 m.

$1\,km = 1000\,m$

$3\,km = 3 \times 1000$

$= 3000\,m.$

$3000 : 300$

$30 : 3 = 10 : 1$

Question

Find the ratio of the following:
60 min to 60 sec.

A 1 : 1

B 60 : 1

C 1 : 60

D 36 : 1

1 Min = 60 sec.

60 Min = 60 × 60

= 3600 sec.

360∅ : 6∅

360 : 6

60 : 1

PERCENTAGE

- A percentage is a number or ratio expressed as a fraction of 100.
- It is denoted using the percentage sign %.
- For example : 75% is equal to the fraction

$$\frac{75}{100} = \frac{3}{4}$$

64.1.

$$\frac{64}{100}$$

89.1.

$$\frac{89}{100}$$

Question

Express the following as a percentage: $\frac{12}{25}$

A 36%

B 48%

C 44%

D 60%

$\frac{12}{25} \times 100\%$

$= 48\%$

Question

The ratio 5 : 4 expressed as a percent equals

A 12.5%

B 40%

C 80%

D 125%

$\frac{5}{4_1} \times \frac{25}{100_1} \cdot 1.$

$= 125 \cdot 1.$

Question

Convert percentage to ratios: 0.75%

A 3 : 40

B 3 : 4

C 40 : 3

D 3 : 400

$$\frac{0.75 \times 100}{100 \times 100}$$

$$\frac{75}{10000}$$

$$= \frac{3}{400}$$

$$= 3 : 400$$

Question

What per cent of 5 kilometer is 500 m?

5000 m.

A 10%

B 20%

C 15%

D 1%

$x\%$ of $5000 = 500$

$\frac{x}{100} \times 5000 = 500$

$x \times 50 = 500$

$x = \frac{500}{50}$

$= \frac{50}{5} = 10\%$

$\frac{10}{100} \times 5000$

$= 500$

Question

10·1·

If 60% people in a city like cricket, 30% like football and the remaining like other games, then what per cent of the people like other games? If the total number of people is 50 lakh, find the exact number who like each type of game.

$60\% + 30\% + x\% = 100\%$

$90\% + x\% = 100\%$

$x\% = 100 - 90$

$x = 10\%$

Cricket = 60% of 50,00,000

$= \frac{60}{100} \times 50,00,000$

$= \boxed{30,00,000}$

Football = 30% of 50,00,000

$= \frac{30}{100} \times 50,00,000$

$= \boxed{15,00,000}$

Other Game = 10%

Halwa ques 1.


100
120
150
Cost price.
(C.P)
Selling price
(S.P)
Marked price.
(M.P)

COST PRICE AND SELLING PRICE

- **Cost Price (CP):**
  The amount for which an article is bought is called its cost price.

- **Selling Price (SP):**
  The amount for which an article is sold is called its selling price .

- **Marked Price(MP):**
  In big shops and departmental stores, every article is tagged with a card and its price is written on it. This is called the marked price of that article

PROFIT AND LOSS

- **Profit:** S.P > C.P

C.P: 100 S.P: 120

Profit = S.P − C.P

- **Loss:** C.P > S.P

C.P: 100 S.P: 90

Loss = C.P − S.P

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

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

DISCOUNT

- Discount is a reduction given on the Marked Price (MP) of the article.

- This is generally given to attract customers to buy goods or to promote sales of the goods.

C.P	S.P	M.P
100	120	150

Discount = M.P − S.P

Discount % = $\frac{\text{Discount}}{\text{M.P}} \times 100\%$

Question

A table marked at Rs15,000 is available for Rs14,400. Find the discount given and the discount per cent.

$$\text{Discount} = 15,000 - 14,400$$
$$= ₹600$$

$$\text{Discount \%} = \frac{\text{Discount}}{\text{M.P}} \times 100\%$$

Discount

4% of 15,000
= 600

$$\frac{\cancel{600}^{4}}{\cancel{15,000}} \times \cancel{100}\%$$
$$= 4\%$$

Question

An almirah is sold at Rs5,225 after allowing a discount of 5%. Find its marked price

$S.P = 5225$

$M.P = S.P + \text{Discount}$

$M.P = 5225 + 5\% \text{ of } M.P$

$5225 = M.P - 5\% \text{ of } M.P$

$= M.P\left[1 - \frac{5}{100}\right]$

$= M.P\left[\frac{1}{1} - \frac{1}{20}\right]$

$= M.P\left[\frac{1\times 20}{1\times 20} - \frac{1}{20}\right]$

$$\begin{array}{r} 275 \\ 19\overline{)5225} \\ 38 \\ \hline 142 \\ -133 \\ \hline 95 \\ -95 \\ \hline 00 \end{array}$$

$5225 = M.P\left(\frac{19}{20}\right)$

$\frac{5225\times 20}{19} = M.P$

$M.P = \frac{5225\times 20}{19}$

$= 275\times 20$

$= 5500$

Sales Tax/Value Added Tax/Goods and service Tax

- Sales Tax, Value Added Tax, Goods and Services Tax are charged by the shopkeeper from the customer on selling price of an item and is added to the value of the bill.

$$\begin{array}{r} 1800 \text{ (original price)} \\ +\ 180 \quad \text{(Tax)} \\ \hline 1980 \text{ (S.P)} \end{array}$$

Question

Waheeda bought an air cooler for Rs3300 including a tax of 10%. Find the price of the air cooler before VAT was added.

$$S.P = \boxed{\text{Original price}} + \text{Tax}$$

$$3300 = O.P + 10\% \text{ of } O.P$$

$$= O.P\left[1 + \frac{10}{100}\right]$$

$$= O.P\left[\frac{1\times10}{1\times10} + \frac{1}{10}\right]$$

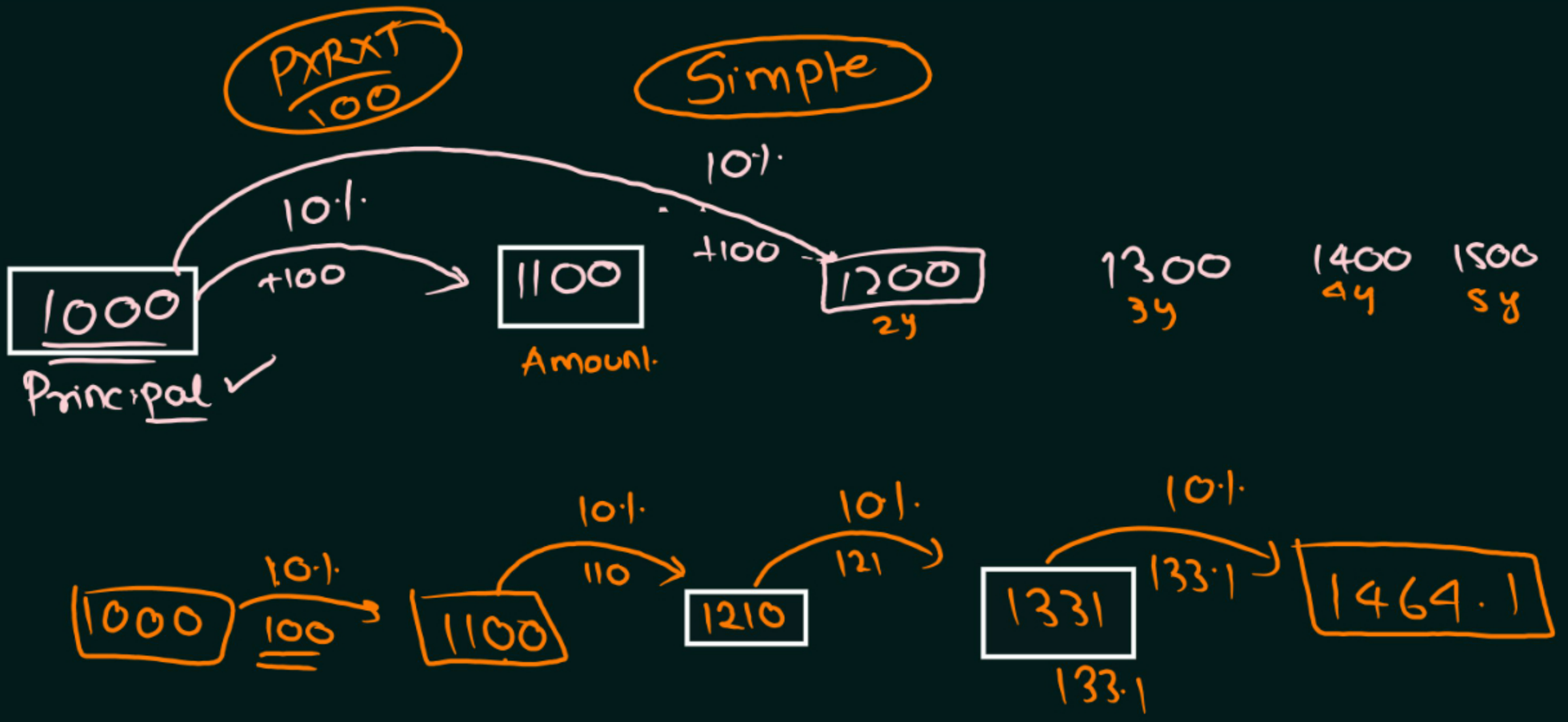
$$= O.P\left[\frac{10}{10} + \frac{1}{10}\right]$$

$$3300 = O.P\left(\frac{11}{10}\right)$$

$$\frac{3300\times10}{11} = O.P$$

$$300\times10 = O.P$$

$$\boxed{O.P = 3000}$$


PXRXT
100
Simple
10·1·
10·1·
+100
+100
1000
1100
1200
Amount
Principal
1300
3y
1400
4y
1500
5y
10·1·
10·1·
10·1·
1000
100
1100
110
1210
121
1331
133·1
133·1
1464·1

Compound Interest

- Simple interest is calculated on the principal, or original, amount of a loan.
- Compound interest is calculated on the principal amount and the accumulated interest of previous periods, and thus can be regarded as "interest on interest."

Compound Interest

Interest compounded annually:

Then, $\boxed{A = P\left(1 + \frac{R}{100}\right)^n}$

A = Amount, P = Principal, R = Rate, n = Time (in years)

Compound Interest = Amount - Principal

$I = A - P$

Question

Find the compound interest on Rs. 25,000 (P) for 3 years (n) at 10% per annum (r), compounded annually.

$$A = P\left[1+\frac{R}{100}\right]^n$$

$$= 25{,}000\left[1+\frac{10}{100}\right]^3$$

$$= 25000\left[\frac{1}{1}+\frac{1}{10}\right]^3$$

$$= 25000\left[\frac{1\times10}{1\times10}+\frac{1}{10}\right]^3$$

$$= 25000\left[\frac{10}{10}+\frac{1}{10}\right]^3$$

$$= 25000\left[\frac{11}{10}\right]^3$$

$$= 25000\times\frac{11}{10}\times\frac{11}{10}\times\frac{11}{10}$$

$$= 25\times11\times11\times11$$

$$= \underline{275\times11\times11}$$

$$= 3025\times11$$

$$I = \underline{\underline{33275}}$$

$$I = A - P$$

$$= 33275 - 30000$$

$$I = ₹\boxed{3275}$$

Question

The compound interest on Rs 5,000 (P) at 8% (R) per annum for 2 (n) years compounded annually, is:

$$A = P\left(1+\frac{R}{100}\right)^n$$

$$= 5000\left(\frac{1}{1}+\frac{8}{100}\right)^2$$

$$= 5000\times\left(\frac{1\times100}{1\times100}+\frac{8}{100}\right)^2$$

$$= 5000\times\left[\frac{100+8}{100}\right]^2$$

$$= 5000\times\left[\frac{108}{100}\right]^2$$

$$= 5000\times\frac{108}{100}\times\frac{108}{100}$$

$$= \frac{5\times108\times108}{1\times2}$$

$$= \frac{11664}{2}$$

$$A = 5832$$

$$I = A-P$$

$$= 5832-5000$$

$$= ₹832$$

Question

Find CI on a sum of Rs8000 (P) for 2 (n) years at 5% (r) per annum compounded annually.

A Rs 820

B Rs 882

C Rs 441

D Rs 800

Halwa Question.

Application Of Compound Interest

In each of the following situations we use the CI formula.

[i] Increase (or decrease) in population

[ii] The growth of bacteria when the rate of growth is known

[iii] Depreciation in the values of machines, etc., at a given rate

Application Of Compound Interest

The population of a city was 20,000 (P) in the year 1997. It increased at the rate of 5% p.a. (r) Find the population at the end of the year 2000.

$$A = P\left(1+\frac{R}{100}\right)^n$$

$$= 20000\left(1+\frac{5}{100}\right)^3$$

$$= 20,000\left(\frac{1}{1}+\frac{1}{20}\right)^3$$

$$= 20,000\left(\frac{1\times 20}{1\times 20}+\frac{1}{20}\right)^3$$

$$= 20,000\left[\frac{20}{20}+\frac{1}{20}\right]^3$$

$$= 20,000\left[\frac{21}{20}\right]^3$$

$$= 20\,000 \times \frac{21}{20}\times\frac{21}{20}\times\frac{21}{20}$$

$$= \frac{10\times 21\times 21\times 21}{4} = \frac{10\times 441\times 21}{4} = \frac{92610}{4} = 23152.2..$$

Application Of Compound Interest

In a certain experiment the count of bacteria was increasing at the rate of 2.5% per hour. Initially, the count was 512000. Find the bacteria at the end of 2 hours.

$$A = 512000 \times \left(1 + \frac{5}{2 \times 100}\right)^2$$

$$= 512000 \times \left(1 + \frac{1}{40}\right)^2$$

$$= 512000 \times \left(\frac{40}{40} + \frac{1}{40}\right)^2$$

$$= 512000 \left(\frac{41}{40}\right)^2$$

$$= 512000 \times \frac{41}{40} \times \frac{41}{40}$$

$$= 320 \times 41 \times 41$$

$$= 320 \times 1681$$

$$= 5,37,920$$

$$\begin{array}{r} 2 \\ 1\ 1 \\ 2\ 1\ 6\ 8\ 1 \\ \times \quad 3\ 2 \\ \hline 3\ 3\ 6\ 2 \\ 5\ 0\ 4\ 3\ \times \\ \hline 5\ 3\ 7\ 9\ 2 \end{array}$$

Application Of Compound Interest

A scooter was bought at 42,000. Its value depreciated at the rate of 8% per annum. Find its value after one year.

$$A = P\left(1 - \frac{R}{100}\right)^n$$

$$= 42000\left(\frac{1 - \frac{8}{100}}{1}\right)^1$$

$$= 42000 \times \frac{92}{100}$$

$$= 420 \times 92$$

$$= ₹38640$$

$$\begin{array}{r} 92 \\ \times 42 \\ \hline 184 \\ 368^{x} \\ \hline 3864 \end{array}$$

Thank You