

Percentages

① Fractions as percentages

Method: To change a fraction to a percentage, multiply the fraction by 100. or $\frac{100}{1}$

Eg 1) write $\frac{1}{5}$ as a percentage.

$$\frac{1}{5} \times 100 \quad \underline{\text{OR}} \quad \frac{1}{5} \times \frac{100}{1} = \frac{100}{5} = 20\%$$
$$\frac{100}{5} = 20\%$$

Eg2) write $\frac{3}{4}$ as a percentage.

$$\frac{3}{4} \times 100$$

OR

$$\frac{3}{4} \times \frac{100}{1}$$

$$\frac{300}{4} = 75\%$$

$$\frac{300}{4} = 75\%$$

② Decimals to percentages.

Method: To change a decimal to a %
Multiply by 100

Eg 1) Change the decimals to percentages

$$1) \underbrace{.25} \times 100 \\ 25\%$$

$$2) \underbrace{.80} \times \underline{100} \\ 80\%$$

$$3) \underbrace{.125} \times \underline{100} \\ 12.5\%$$

3) Percentage to fraction or decimal

Method: Divide the percentage by 100, and remove % sign.

Eg) Convert each of the following to fraction and decimal form.

① 30%

$$\frac{30}{100} = \frac{3}{10} \text{ [SD]}$$

fraction calc

$$= 0.3 \text{ decimal}$$

② 22%

$$\frac{22}{100}$$

Simply $\div 2$

$$\frac{11}{50} \text{ [SD]}$$

$$= 0.22$$

③ 65%

$$\frac{65}{100} \Rightarrow \frac{13}{20}$$

$$\text{[SD]}$$

$$0.65$$

④ 62.5%

$$0.625$$

$$\frac{62.5}{100} = \frac{5}{8}$$

Table of common decimals, fractions and percentages

Decimal	Fraction	Percentage.
•1	$\frac{1}{10}$	10%
•125	$\frac{1}{8}$	12.5%
•20	$\frac{1}{5}$	20%
•25	$\frac{1}{4}$	25%
•333	$\frac{1}{3}$	33.3%
•4	$\frac{2}{5}$	40%
•5	$\frac{1}{2}$	50%
•666	$\frac{2}{3}$	66.6%
•625	$\frac{5}{8}$	62.5%
•75	$\frac{3}{4}$	75%

$$1 = \frac{1}{1} = 100\%$$

C/W \rightarrow H/W

Pg 147

Q 2, 3, 4, 5

To find a percentage of a given amount

Method: $\frac{\text{Given \%}}{100} \times \text{Given amount.}$

Calculator.

$$24 \times 25\% =$$

Eg1) What is 25% of 24?

$$\text{Given \%} = 25\%$$

$$\text{Given amount} = 24$$

$$\frac{25}{100} \times 24 = 6$$

calculator

C/W

pg 150

Q1, 2, 3.

No calculator $\frac{1}{4} \times \frac{24}{1} = \frac{24}{4} = 6$

Note: OF means multiply

to input % on the calculator

[SHIFT] [%]

Expressing one quantity as a percentage of another quantity

$$\text{Method} = \frac{\text{Number}}{\text{Total}} \times 100$$

If Joe got 72 marks out of 80
What was his % mark.

$$\frac{72}{80} \times 100 = 90\%$$

Increasing or decreasing by a given percentage.

If the product or amount is increased by a percentage, the extra is ADDED on to the given amount.

Eg 1) Increase 90 by 10%

$$10\% \text{ of } 90 =$$

$$10\% \times 90 = 9$$

$$\text{Final amount } 90 + 9 = 99$$

$$100 + 10 = 110\%$$

$$\frac{110}{100} = 1.1$$

$$90 \times 1.1 = 99$$

Eg 2) Increase 60 by 20%

$$20\% \times 60 = 12$$

$$60 + 12 = 72$$

$$100 + 20 = 120\%$$

$$\frac{120}{100} = 1.2$$

$$60 \times 1.2 = 72$$

When a product or amount is decreased by a given percentage, the amount is subtracted.

Eg 1) Decrease 40 by 10%

$$10\% \times 40 = 4$$

$$40 - 4 = 36$$

$$100 - 10\% = 90$$

$$\frac{90}{100} = .9$$

$$40 \times .9 = 36$$

Eg 2) Decrease 120 by 20%

$$20\% \times 120 = 24$$

$$120 - 24 = 96$$

$$100 - 20 = 80\%$$

$$\frac{80}{100} = .8$$

$$120 \times .8 = 96$$

Eg 3) Decrease 200 by 5%

$$5\% \times 200 = 10$$

$$200 - 10 = 190$$

$$100 - 5 = 95\%$$

$$\frac{95}{100} = .95$$

$$TV = €720$$

VAT - valued added Tax
- on every product or service

Find the cost of the TV with 21% VAT added to the price.

$$\textcircled{1} \quad 720 \times 21\% = 151.20$$

Price of TV + VAT

$$720 + 151.20 = €871.20$$

?

$$\text{TV} + \text{VAT}$$
$$100\% + 21\% = 121\%$$

TV plus the VAT is €871.20, Find the cost of the TV before VAT was added.

$$121\% = 871.20 \quad \text{Find}$$

$$1\% = \frac{871.20}{121} = 7.20$$

$$100\% = 7.2 \times 100 = €720$$

Divide
to find
1%

Eg2) A bicycle plus the VAT at 20% sells for €780 find the cost of the bicycle before the VAT was added.

$$\begin{array}{l} \text{Bicycle} + \text{VAT} = 780 \\ \text{100\%} + 20\% = 120\% \\ ? \end{array}$$

find 1%
by division

$$\text{120\%} = 780$$

$$1\% = \frac{780}{120} = 6.50$$

$$100\% = 6.50 \times 100 = \text{€}650.$$

Eg3) A man bought a suit for €256 at a discount of 20% find the cost of the suit before the sale.

$$\begin{array}{r} \text{Suit} \\ 100\% \end{array} + \text{discount} = 256$$
$$- 20\% = 80\%$$

$$80\% = €256$$

Divide

$$1\% = \frac{256}{80} = 3.20$$

$$100\% = 3.20 \times 100 = €320$$

H/w Pg 158

Q5, 7, 8, 9.

Pg 158 Q 11, 12, 13

$$\begin{array}{r} \text{Q11} \quad 200 \text{ pens} \times 2.40 = \text{€}480 \\ \text{VAT @ } 20\% \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \times 20\% \\ \hline \text{Total pens + VAT} \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad 96 \end{array}$$

$$480 + 96 = \text{€}576$$

$$\begin{array}{r} \text{Q12) } \text{€}240 \text{ Labour} \quad \times 10\% = 24 \quad + 240 = 264 \\ \text{€}360 \text{ Parts} \quad \times 20\% = 72 \quad + 360 = \underline{\underline{432}} \\ \text{Total €}696 \end{array}$$

Q13) €420,000 sale price.

fees @ 1%

$$420,000 \times 1\% = \begin{array}{r} \text{fees} \\ 4,200 \\ \times 21\% \\ \hline 882 \text{ VAT} \end{array}$$

$$\text{Bills} = \text{Fees} + \text{VAT}$$

$$4,200 + 882 = \text{€}5082$$

Percentage Profit

Cost Price : Amount the shopkeeper buys the product for.

Selling Price : The price on product when its sold in the shop.

Profit : Selling price - cost price.

Formula % profit : $\frac{\text{Profit}}{\text{Cost Price}} \times 100$

Eg 1 Find the selling price of an item which has a cost price of €20 sold at a profit of 20%

$$\begin{aligned} \text{€}20 \times 20\% &= \text{€}4 \quad \text{Profit} \\ \text{Selling Price } \underset{\text{CP}}{20} + \underset{\text{Profit}}{4} &= 24 \end{aligned}$$

Eg 2) Find the % profit of an item which has a cost price of €60 and a selling price of

$$\begin{aligned} \text{€}63 \\ \text{Profit } 63 - 60 &= \text{€}3 \quad \frac{3}{60} \times 100 = 5\% \end{aligned}$$

H/W pg 161 Q2+3 (iii) Q2 done.

Percentage Loss

Formula $\frac{\text{Loss}}{\text{Cost Price}} \times 100$

A loss is made on an item when it is sold for less than the cost price

Find the % loss if the cost price of an item is €24 and is sold for €22.80

Loss $24 - 22.80 = €1.20$

$$\% \text{ Loss} = \frac{1.20}{24} \times 100 = 5\%$$

C/W

Pg 161

Q 5, 6, 7, 8.

Pg 161 Q5

i) SP = €10 25% profit

Find ^{100%} cost price.
100% = CP.
25% = Profit

$$125\% = 10$$

$$1\% = \frac{10}{125} = 0.08$$

$$100\% = 0.08 \times 100 = €8 \text{ cost price.}$$

iii) SP = 57.60 20% loss

Find CP
100% = CP

$$80\% = 57.60$$

$$100 - 20 = 80\%$$

$$1\% = \frac{57.60}{80} = 0.72$$

$$100\% = 0.72 \times 100 = €72$$