

Ratio and Proportion

Divide €90 in ratio 4:5

Unitary method

$$9 \text{ parts} = €90$$

$$1 \text{ part} = €10$$

$$4 \text{ parts} = €40$$

$$5 \text{ parts} = €50$$

Divide €85 in ratio $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$

$$\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$$

$$\frac{6}{12} : \frac{4}{12} : \frac{3}{12}$$

$$6 : 4 : 3$$

$$13 \text{ parts} = €85$$

$$1 \text{ part} = €6.54$$

$$6 \text{ parts} = €39.24$$

$$4 \text{ parts} = €26.15$$

$$3 \text{ parts} = €19.52$$

Divide €105 between A, B and C so that B gets twice A's share and C gets $\frac{1}{3}$ of B's share.

$$A : B : C$$

$$1 : 2 : 1$$

$$3 : 6 : 2$$

$$11 \text{ parts} = €105$$

$$1 \text{ part} = €9.54$$

$$A = €28.64$$

$$B = €57.27$$

$$C = €19.09$$

$$p : q = 3 : 5 \quad q : r = 6 : 7 \quad \text{find} \\ p : r$$

$$p : q : r \\ 3 : 5 : 6 : 7$$

$$18 : 30 : 35$$

$$p : r = 18 : 35$$

Note $a : b = \frac{a}{b}$

3 apples cost £1.20 find cost of 5 apples.

$$3 \text{ apples} = \text{£}1.20$$

$$1 \text{ apple} = \text{£}0.40$$

$$5 \text{ apples} = \text{£}2.00 \quad \text{Direct proportion}$$

6 men take 15 days to build a wall how long will 10 men take.

$$6 \text{ m} = 15 \text{ days}$$

$$1 \text{ m} = 90 \text{ days}$$

$$10 \text{ m} = 9 \text{ days} \quad \text{Inverse proportion.}$$

A cold tap takes 4 minutes to fill a bath. Hot tap takes 5. How long when both are on?

$$\text{Cold tap will fill } \frac{1}{4} \text{ in 1 minute}$$

$$\text{Hot tap } \frac{1}{5}$$

Together

$$\frac{1}{4} + \frac{1}{5} = \frac{9}{20}$$

$$\text{Time } \frac{1}{\frac{9}{20}} = \frac{20}{9} \text{ minutes.}$$

$$\underline{VAT} = p \cdot t.$$

A bill is € 27 before VAT of 18%.
Find total bill.

$$27 \times 1.18 = € 31.86$$

A bill is € 250 before VAT and € 302.50 after VAT is added. Find percentage of VAT.

$$VAT = 302.50 - 250$$

$$52.50$$

$$\% \text{ VAT} = \frac{52.50}{250} \times \frac{100}{1} = 21\%$$

$$VAT \text{ rate} = \frac{VAT}{\text{Cost}} \times \frac{100}{1}$$

A bill comes to € 682.44 with vat of 21%.
included find vat.

$$121\% = 682.44$$

$$1\% = \frac{682.44}{121}$$

$$100\% = \frac{682.44}{121} \times 100 = € 564$$

Percentage error

Can be asked on both papers.

2.53 is rounded to 2.5. Find percentage error.

$$\text{Error} = 2.53 - 2.5 = 0.03$$

$$\% \text{ error} = \frac{\text{error}}{\text{real}} \times \frac{100}{1}$$

$$\frac{0.03}{2.53} \times \frac{100}{1} = 1.2\%$$

Foreign Exchange .

A car cost \$15,000 is sold for €14,500. Find percentage profit if exchange rate is €1 = \$1.16.

Both to \$
 $14,500 \times 1.16 = \$16,820$

Profit \$1820

$$\text{Mark up} = \% \text{ profit} = \frac{\text{Profit}}{\text{Cost}} = \frac{1820}{15000} \times \frac{100}{1} = 12.13\%$$

Both to €
 $\frac{15000}{1.16} = €12931.03$

Profit = 1568.97

$$\% \text{ Profit} = \frac{1568.97}{12931.03} \times \frac{100}{1}$$

IMF = Irish to Foreign Mult

FDI = Foreign to Irish Direct

A coat is sold in Dublin for €80 and New York for \$95 find exchange rate.

$$€80 = \$95$$

$$€1 = \frac{95}{80} = \$1.1875$$

$$= \$1.19$$

Scientific Notation.

Write 2,300,000 in form $a.b \times 10^n$

$$2,300,000 = 2.3 \times 10^6$$

Scientific Not $a.b \times 10^n$

$n > 0 \Rightarrow$ big number

$n < 0 \Rightarrow$ small number.

Simplify $\frac{(2.5 \times 10^7)(1.2 \times 10^6)}{3 \times 10^{-5}}$

Middle of bottom line on calculator
 $= 1 \times 10^{20}$

Tax.

The standard rate of income tax is 20% and the higher rate is 42%.

Fiona has tax credits of €1493 for the year and a standard rate cut-off point of €30 000.

She has a gross income of €31 650 for the year.

- (i) ✎ After tax is paid, what is Fiona's income for the year?
- (ii) ✎ What would Fiona's gross income for the year need to be in order for her to have an after-tax income of €29 379?

Gross = before deduction.

Net = after deductions.

$$\begin{array}{r} \text{Gross tax} \\ - \text{Credit} \\ \hline \text{Net tax} \end{array}$$

Credit = money off gross tax.

$$31650 \left\{ \begin{array}{l} 30000 \text{ at } 20\% \\ 1650 \text{ at } 42\% \end{array} \right.$$

$$0.2 \times 30000 = 6000$$

$$0.42 \times 1650 = \frac{693}{\underline{\hspace{1cm}}}$$

$$\text{Gross tax} = 6693$$

$$\begin{array}{r} \text{Credit} \\ \text{Net tax} \end{array} = \frac{1493}{\underline{5200}}$$

Net income = take home pay

$$31650 - 5200 = \text{€}26,450$$

New After tax €29379

$$\text{Net extra } 29379 - 26450 = \text{€}2929$$

Top rate of income 100% $\left\{ \begin{array}{l} 42\% \text{ gov} \\ 58\% \text{ keep.} \end{array} \right.$

$$58\% = 2929$$

$$1\% = \frac{2929}{58}$$

$$\begin{aligned} \text{Gross extra } 100\% &= \frac{2929}{58} \times \frac{100}{1} \\ &= \text{€}5050 \end{aligned}$$

$$31650 + 5050 = \text{€}36,700$$

$$\text{Mark up} = \frac{\text{Profit}}{\text{C.G.}} \times \frac{100}{1}$$

$$\text{Margin} = \frac{\text{Profit}}{\text{Sell}} \times \frac{100}{1}$$

A coat is cost €425, is sold with a margin of 15%. Find selling price.

$$\text{Margin} = \frac{\text{Profit}}{\text{Sell}} \times \frac{100}{1}$$

$$\text{Sell} = \text{cost} + \text{Profit} = 425 + P \quad \text{let } P = \text{profit}$$

$$15 = \frac{P}{P+425} \times 100$$

$$15(P+425) = 100P$$

$$15P + 6375 = 100P$$

$$6375 = 85P$$

$$P = 75$$

$$\text{Cost} \quad 425 + 75 = \text{€ } 500$$

$$\begin{array}{l} \uparrow \\ \text{Sell} = 100\% \\ \text{Cost} = 85\% \end{array}$$

$$85\% = 425$$

$$1\% = \frac{425}{85}$$

$$100\% = \frac{425}{85} \times \frac{100}{1} = \text{€ } 500$$