Chapter 8 notes   Arithmetic

Compound interest.

P = principal   the amount of money you start with.

T = time   Always one year.

R = rate of interest   always given as a percentage

Amount = Principal and interest added together.

FORMULA = $\frac{P \, x \, T \, x \, R}{100} = Interest$ Always do one year at a time. Don't forget to add on the interest earned each year.

Example: Calculate the compound interest on €600 for two years at 5%.

Answer: Year 1 $\frac{600 x 1 x 5}{100} = 30$

          Year 2 $\frac{630 x 1 x 5}{100} = 31.50$

Total interest = 30 + 31.50 = 61.50.

PERCENTAGES: The amount it cost you is always 100%

          To get a percentage put the amount over the total and multiply by 100.

If you are given the total + vat (20%), let the amount equal 120%.

                              Divide by 120 and multiply by 100 to get original amount.

Example: A bill for €57.60 includes VAT at 20%. Find the amount of the bill before VAT was added on.

Answer: 57.60 = 120%

(÷120)   0.48 = 1%

(x100)   48 = 100%.   €48 was the value of the bill before VAT was added on.

Income Tax: Get percentage of standard rate on first amount.

          Get percentage on higher rate of balance.

          Add these two amounts together.

          Subtract tax credits

          This will give you income tax.

Example: A woman earns €45,000. She has a standard rate cut off point of €28,000 and tax credits of €4000. Her standard rate of tax is 20%. She pays tax on the balance at 42%. How much income tax does she pay?

Answer: $\frac{20}{100} x \ 28000 \quad + \quad \frac{42}{100} x \ 17000 \quad - \quad 4000$

$\qquad\qquad\quad 5600 \qquad\qquad + \qquad 7140 \qquad - \qquad 4000$

Income tax = €8740.

RATIO: If you are given the full amount   Add ratios together

                 Divide the full amount by this figure.

                 Multiply each ratio by this number.

Example: 572 is shared between three people in the ratio 2:3:6. How much does each get?

Answer: $\frac{572}{11} = 52$ (1 part)

     52 x 2 = **104**   52 x 3 = **156**   52 x 6 = **312**

If you are given one of the ratio amounts

Divide the figure by this amount and multiply by added ratios to get full amount

Example: A prize fund is divided between A,B and C in the ratio 4:3:2. If C gets €1224 how much is the total fund?

Answer: €1224 = 2 parts

(÷2)   €612   = 1 part

(X9)   €5508 = 9 parts which is the total fund.

If the ratios are given as fractions

Multiply each ratio by common denominator to get rid of the fractions.

Ratio : $\frac{1}{2}$: $\frac{1}{4}$: $\frac{1}{12}$ (x12)   6 : 3 : 1 and work with these ratios instead.

Foreign Currency   Write up the exchange rate you have been given.

        Put € under € and $ under $ (for example.)

        Cross multiply and you will find your unknown.

Example :   If €1 = 95 yen how many euros would you get for 12000 yen.

Answer: €x   = 12000 yen

    95x = 12000   (cross multiply)

(÷ 95)   x = €126.32

Speed = $\frac{distance}{time}$

Time is always to be in hours. Example 20 minutes = $\frac{1}{3}$ $hour$ and 50 $minutes$ is $\frac{50}{60}$ which is 0.83333 as a decimal.

If the question has been given to you in two legs, and you have been asked to find average speed for the entire journey then find total distance and total time and get average speed from these two figures.

Example: A train travels for 2 hours at 60km/hr and then for one hour at 90km/hr. What is the average speed over the three hours.

Answer: **_Total time = 3 hours._**

First leg $S = \frac{d}{t}$. $60 = \frac{d}{2}$.   120km = distance

Second leg $90 = \frac{d}{1}$ 90km = distance

                Total distance = 210km

                $S = \frac{d}{t}$ $S = \frac{210}{3}$ average speed for the entire journey is 70km/hr

Sometimes they give you a speed in metres per second and ask you to change it to kilometres per hour.

Multiply by 60 to get it into minutes and then again by 60 to get it into hours and then change the metres to kilometres by dividing your answer by 1000.

Example: A distance of 18km took 40 minutes. Express this in metres per second.

Answer: (÷40to get 1 minute) $\frac{18}{40} = 0.45$ 0.45 km in 1 minute

                (÷60 to get 1 second) $\frac{0.45}{60} = 0.0075$ 0.0075km in one second

                (x1000 to change it into metres.)   7.5 metres per second.