ARITHMETIC (Q 1, PAPER 1)

2007

1 (a) Convert 164 miles to kilometres, taking 5 miles to be equal to 8 kilometres.

(b) €8500 was invested for 2 years at compound interest.

(i) The rate of interest for the first year was 4%.
Find the amount of the investment at the end of the first year.

(ii) The amount of the investment at the end of the second year was €9237·80.
Find the rate of interest for the second year.

(c) The table shows the hours Alan worked over four days.

Day	Thursday	Friday	Saturday	Sunday
Hours worked	9	9	9·5	*h*

Alan's basic rate of pay is €15·60 per hour.
He is paid one and a half times the basic rate for work on Saturday and Sunday.

(i) Calculate Alan's total pay for Thursday, Friday and Saturday.

(ii) Alan was paid a total of €702 for the four days' work.
Find *h*, the number of hours Alan worked on Sunday.

SOLUTION

1 (a)

If one quantity is **DIRECTLY PROPORTIONAL** to another, then if you multiply or divide one quantity by a number you must do the same to the other quantity.

Convert 164 miles to kilometres, taking 5 miles to be equal to 8 kilometres.

5 miles = 8 km

1 mile = $\frac{8}{5}$ km

164 miles = $\frac{8}{5} \times 164 = 262.4$ km

1 (b) (i) If the sum of money P is invested for n years at the rate per annum of R% which remains unchanged for each year then the amount at the end of n years is:

$$A = P\left(1+\frac{R}{100}\right)^n$$ 3

Year 1:

P = €8,500
n = 1
R = 4
A = ?

$$A = P\left(1+\frac{R}{100}\right)^n = 8500\left(1+\frac{4}{100}\right)^1 = €8,840$$

1 (b) (ii)

Year 2:
P = €8,840
n = 1
R = ?
A = €9237·80

$$A = P\left(1+\frac{R}{100}\right)^n \Rightarrow 9237.8 = 8840\left(1+\frac{R}{100}\right)^1$$

$$\Rightarrow \left(1+\frac{R}{100}\right) = \frac{9237.8}{8840} \Rightarrow 1+\frac{R}{100} = 1.045 \Rightarrow \frac{R}{100} = 0.045$$

$$\therefore R = 4.5\%$$

1 (c)

Day	Thursday	Friday	Saturday	Sunday
Hours worked	9	9	9·5	h

Basic Rate: €15.60 per hour
Weekend rate: $€15.60 \times 1.5 = €23.40$

1 (c) (i) Number of hours worked on Thursday and Friday at the basic rate: 18 hours
Number of hours worked on Saturday at the weekend rate: 9.5 hours
Pay for these 3 days = $18 \times €15.60 + 9.5 \times €23.40 = €503.10$

1 (c) (ii) Total pay for 4 days = €702
Total pay for Sunday: $€702 - €503.10 = €198.90$

$$\therefore h \times €23.40 = €198.90 \Rightarrow h = \frac{198.90}{23.40} = 8.5 \text{ hours}$$