

29. On 1st April 2002, Mr Sim deposited \$20 000 into his savings account and invested \$10 000 in his investments account for four years each.
- (a) If the savings account earned the simple interest at the rate of  $x\%$  per annum, express, in terms of  $x$ , the total amount  $P$ , in dollars, received on 1st April 2006.
- (b) If the investments account earned the compound interest at the rate of  $3\%$  per annum, find, correct to the nearest dollar, the total amount  $Q$ , in dollars, received on 1st April 2006.  
Hence, find the value of  $x$ , correct to 4 decimal places where necessary, if
- (i)  $P : Q = 2 : 1$ ,
- (ii)  $P : Q = 20 : 11$ ,
- (iii)  $P : Q = 19 : 10$ .

**Solution:**

$$\begin{aligned} \text{(a)} \quad I &= P \times i\% \times n \\ &= 20\,000 \times \frac{x}{100} \times 4 \\ &= 800x \\ P &= \$(20\,000 + 800x) \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad A_n &= P \left(1 + \frac{i}{100}\right)^n \\ Q &= 10\,000 \times \left(1 + \frac{3}{100}\right)^4 \\ &= \$11\,255 \end{aligned}$$

$$\begin{aligned} \text{(i)} \quad P : Q &= 2 : 1 \\ P &= 2Q \\ 20\,000 + 800x &= 2 \times 11\,255 \\ 800x &= 2510 \\ x &= 3.1375 \text{ (correct to 4 d. p.)} \end{aligned}$$

$$\begin{aligned} \text{(ii)} \quad P : Q &= 20 : 11 \\ 11P &= 20Q \\ 11(20\,000 + 800x) &= 20 \times 11\,255 \\ 220\,000 + 8800x &= 225\,100 \\ 8800x &= 5100 \\ x &= 0.5795 \text{ (correct to 4 d. p.)} \end{aligned}$$

$$\begin{aligned} \text{(iii)} \quad P : Q &= 19 : 10 \\ 10P &= 19Q \\ 10(20\,000 + 800x) &= 19 \times 11\,255 \\ 200\,000 + 8000x &= 213\,845 \\ 8000x &= 13\,845 \\ x &= 1.7306 \text{ (correct to 4 d. p.)} \end{aligned}$$

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