

1 Alberto and Maria share \$240 in the ratio 3 : 5.

(a) Show that Alberto receives \$90 and Maria receives \$150.

$$\begin{aligned} \text{Answer(a)} \quad \text{Alberto: } & \frac{3}{3+5} \times \$240 & \text{Maria: } & \frac{5}{3+5} \times \$240 \\ & = \frac{3}{8} \times \$240 = \$90 & & = \frac{5}{8} \times \$240 = \$150 \end{aligned} \quad [1]$$

(b) (i) Alberto invests his \$90 for 2 years at $r\%$ per year **simple** interest.

At the end of 2 years the amount of money he has is \$99.

Calculate the value of r .

$$\begin{aligned} \text{Interest} &= \$99 - \$90 = \$9 \\ \text{Interest} &= \$90 \times \frac{r}{100} \times 2 & \frac{\$9}{\$1.8} &= r \\ \$9 &= \$90 \times \frac{r}{100} \times 2 & r &= 5 \\ \$9 &= \$1.8 \times r & & \\ \text{Answer(b)(i)} \quad r &= \dots\dots\dots 5 & & [2] \end{aligned}$$

(ii) The \$99 is 60% of the cost of a holiday.

Calculate the cost of the holiday.

$$\begin{aligned} 60\% &= \$99 & x &= \frac{100\%}{60\%} \times \$99 \\ 100\% &= x & &= \$165 \\ \text{Answer(b)(ii)} \quad \$ & \dots\dots\dots 165 & & [2] \end{aligned}$$

(c) Maria invests her \$150 for 2 years at 4% per year **compound** interest.

Calculate the exact amount Maria has at the end of 2 years.

$$\begin{aligned} \text{Total Amount} &= \$150 \left(1 + \frac{4}{100}\right)^2 \\ &= \$150 (1.04)^2 \\ &= \$162.24 \\ \text{Answer(c)} \quad \$ & \dots\dots\dots 162.24 & & [2] \end{aligned}$$

(d) Maria continues to invest her money at 4% per year **compound** interest.

After 20 years she has \$328.67.

(i) Calculate exactly how much more this is than \$150 invested for 20 years at 4% per year **simple** interest.

$$\begin{aligned} \text{Interest} &= \$150 \times \frac{4}{100} \times 20 & \$328.67 - \$270 &= \$58.67 \\ &= \$120 & & \\ \text{Total Amount} &= \$150 + \$120 & & \\ &= \$270 & \text{Answer(d)(i)} \quad \$ & \dots\dots\dots 58.67 & [3] \end{aligned}$$

(ii) Calculate \$328.67 as a percentage of \$150.

$$\begin{aligned} \frac{\$328.67}{\$150} \times 100\% &= 219.11333\dots\% \\ &\approx 219\% \\ \text{Answer(d)(ii)} & \dots\dots\dots 219 \quad \% & [2] \end{aligned}$$