

1 Jane and Kate share \$240 in the ratio 5 : 7.

(a) Show that Kate receives \$140.

$$\begin{aligned} \text{Answer(a)} \quad \frac{7}{5+7} \times \$240 &= \frac{7}{12} \times \$240 \\ &= \$140 \end{aligned}$$

[2]

(b) Jane and Kate each spend \$20.

Find the new ratio Jane's remaining money : Kate's remaining money.

Give your answer in its simplest form.

$$\begin{aligned} \text{Jane} &= 140 - 20 = 80 & 80 : 120 &= 2 : 3 \\ \text{Kate} &= 140 - 20 = 120 \end{aligned}$$

Answer(b) .....  $\frac{2}{3}$  ..... [2]

(c) Kate invests \$120 for 5 years at 4% per year simple interest.

Calculate the total amount Kate has after 5 years.

$$\begin{aligned} \text{Interest} &= 120 \times \frac{4}{100} \times 5 \\ &= \$24 \end{aligned}$$

$$\begin{aligned} \text{Total Amount} &= \$120 + \$24 \\ &= \$144 \end{aligned}$$

Answer(c) \$ .....  $144$  ..... [3]

(d) Jane invests \$80 for 3 years at 4% per year compound interest.

Calculate the total amount Jane has after 3 years.

Give your answer correct to the nearest cent.

$$\begin{aligned} \text{Total Amount} &= 80 \times \left(1 + \frac{4}{100}\right)^3 \\ &= 80 \times (1.04)^3 \\ &= \$89.98912 \\ &\approx \$89.99 \end{aligned}$$

Answer(d) \$ .....  $89.99$  ..... [3]

(e) An investment of \$200 for 2 years at 4% per year compound interest is the same as an investment of \$200 for 2 years at  $r\%$  per year simple interest.

Find the value of  $r$ .

$$\begin{aligned} 200 \times \left(1 + \frac{4}{100}\right)^2 \\ = 200 \times (1.04)^2 \\ = \$216.32 \end{aligned}$$

$$\begin{aligned} \text{Interest} &= 216.32 - 200 \\ &= \$16.32 \end{aligned}$$

$$\begin{aligned} \text{Interest} &= 200 \times \frac{r}{100} \times 2 \\ 16.32 &= 4 \times r \\ \frac{16.32}{4} &= r \\ r &= 4.08 \end{aligned}$$

Answer(e)  $r =$  .....  $4.08$  ..... [3]