# SIMPLE-COMPOUND INTEREST

**1** **(a)** Kristian and Stephanie share some money in the ratio 3 : 2.
Kristian receives $72.

**(i)** Work out how much Stephanie receives.

$ ..... [2]

**(ii)** Kristian spends 45% of his $72 on a computer game.

Calculate the price of the computer game.

$ ..... [1]

**(iii)** Kristian also buys a meal for $8.40 .

Calculate the fraction of the $72 Kristian has left after buying the computer game and the meal.
Give your answer in its lowest terms.

..... [2]

**(iv)** Stephanie buys a book in a sale for $19.20 .
This sale price is after a reduction of 20%.

Calculate the original price of the book.

$ ..... [3]

**(b)** Boris invests \$550 at a rate of 2% per year simple interest.

Calculate the amount Boris has after 10 years.

\$ ..... [3]

**(c)** Marlene invests \$550 at a rate of 1.9% per year compound interest.

Calculate the amount Marlene has after 10 years.

\$ ..... [2]

**(d)** Hans invests \$550 at a rate of $x$% per year compound interest.
At the end of 10 years he has a total amount of \$638.30, correct to the nearest cent.

Find the value of $x$.

$x =$ ..... [3]

**MARKING SCHEME:**

| | | | |
|---|---|---|---|
| **(a) (i)** | 48 | **2** | **M1** for $\frac{72}{3}$ |
| **(ii)** | 32.4[0] | **1** | |
| **(iii)** | $\frac{13}{30}$ | **2** | **M1** for $\frac{72 - their(ii) - 8.4}{72}$ oe |
| **(iv)** | 24 | **3** | **M2** for $\frac{19.2}{0.8}$ oe<br>or **M1** for recognising 19.2 is 80% |
| **(b)** | 660 | **3** | **M2** for $\frac{550 \times 2 \times 10}{100} + 550$ oe<br>or **M1** for $\frac{550 \times 2 \times 10}{100}$ oe |
| **(c)** | 663.9[0] | **2** | **M1** for $550 \times 1.019^{10}$ oe |
| **(d)** | 1.5[0] | **3** | **M2** for $\sqrt[10]{\frac{638.3[0]}{550}}$ oe<br>or **M1** for $550 \times m^{10} = 638.3[0]$ |

**2** **(a)** Annie and Dermot share \$600 in the ratio 11 : 9.

**(i)** Show that Annie receives \$330.

[1]

**(ii)** Find the amount that Dermot receives.

\$ ..... [1]

Q1 **(b)** **(i)** Annie invests \$330 at a rate of 1.5% per year compound interest.

Calculate the amount that Annie has after 8 years.
Give your answer correct to the nearest dollar.

\$ ..... [3]

**(ii)** Find the amount of **interest** that Annie has, after the 8 years, as a percentage of the \$330.

..... % [2]

**(c)** Dermot has $70 to spend.
He spends $24.75 on a shirt.

**(i)** Find $24.75 as a fraction of $70.
Give your answer in its lowest terms.

..... [1]

**(ii)** The $24.75 is the sale price after reducing the original price by 10%.

Calculate the original price.

$ ..... [3]

**(d)** After one year, the value of Annie's car had reduced by 20%.
At the end of the second year, the value of Annie's car had reduced by a further 15% of its value at the end of the first year.

**(i)** Calculate the overall percentage reduction after the two years.

..... % [2]

**(ii)** After three years the overall percentage reduction in the value of Annie's car is 40.84%.

Calculate the percentage reduction in the third year.

..... % [2]

**MARKING SCHEME:**

| | | | |
|---|---|---|---|
| 1(a)(i) | 600 ÷ (11+ 9) × 11 [ =330] with no errors seen | **M1** | Could be in separate steps |
| 1(a)(ii) | 270 | **1** | |
| 1(b)(i) | 372 cao nfww | **3** | **B2** for answer 371.7…<br>or **M1** for $330 \times \left(1+\frac{1.5}{100}\right)^{8}$ oe not spoiled<br><br>After zero scored, **SC1** for answer 42 or 41.7… |
| 1(b)(ii) | 12.6 or 12.7 or 12.63 to 12.73 | **2** | **M1** for $\frac{\textit{their}\,\textbf{(b)(i)}-330}{330}$ or $\frac{\textit{their}\,\textbf{(b)(i)}}{330}\times 100$ soi by 112.7 or 113<br>After zero scored, **SC1** for answer 12% |
| 1(c)(i) | $\frac{99}{280}$ cao final answer | **1** | |
| 1(c)(ii) | 27.5[0] | **3** | **M2** for $24.75 \div \frac{100-10}{100}$ oe<br>or **M1** for recognising 24.75 as 90[%] oe |
| 1(d)(i) | 32 cao | **2** | **M1** for $\left(1-\frac{20}{100}\right)\left(1-\frac{15}{100}\right)[x]$oe<br>or for $0.15 \times 0.8\,[x]$ oe |
| 1(d)(ii) | 13 cao | **2** | **M1** for $\left(1-\frac{20}{100}\right)\left(1-\frac{15}{100}\right)\times x = 40.84 - 32$ oe seen<br>or for *their* **(d)(i)** + $\left(1-\left(\frac{\textit{their}\,\textbf{(d)(i)}}{100}\right)\right)x = 40.84$ oe |

**3** **(a)** The price of a house decreased from $82 500 to $77 500.

Calculate the percentage decrease.

..... % [3]

**(b)** Roland invests $12 000 in an account that pays compound interest at a rate of 2.2% per year.

Calculate the value of his investment at the end of 6 years.
Give your answer correct to the nearest dollar.

$ ..... [3]

**MARKING SCHEME:**

| | | | |
|---|---|---|---|
| (a) | 6.06 or 6.060 to 6.061 | **3** | **M2** for $\frac{82500-77500}{82500}[\times 100]$ oe<br>or **M1** for $\frac{77500}{82500}[\times 100]$ soi |
| (b) | 13 674 cao | **3** | **M1** for $12000\left(1+\frac{2.2}{100}\right)^6$<br>**A1** for 13673.7... |

**4** **(a)** Rowena buys and sells clothes.

**(i)** She buys a jacket for $40 and sells it for $45.40 .

Calculate the percentage profit.

..... % [3]

**(ii)** She sells a dress for $42.60 after making a profit of 20% on the cost price.

Calculate the cost price.

$ ..... [3]

**(b)** Sara invests $500 for 15 years at a rate of 2% per year simple interest.

Calculate the total interest Sara receives.

$ ..... [2]

**(c)** Tomas has two cars.

**(i)** The value, today, of one car is \$21 000.
The value of this car **decreases** exponentially by 18% each year.

Calculate the value of this car after 5 years.
Give your answer correct to the nearest hundred dollars.

\$ ..... [3]

**(ii)** The value, today, of the other car is \$15 000.
The value of this car **increases** exponentially by $x$ % each year.
After 12 years the value of the car will be \$42 190.

Calculate the value of $x$.

$x =$ ..... [3]

**MARKING SCHEME:**

| | | | |
|---|---|---|---|
| (a)(i) | 13.5 | **3** | **M2** for $\frac{45.4[0]-40}{40}$ [$\times 100$] or $\frac{45.4[0]}{40} \times 100$<br>or **M1** for $\frac{45.4[0]}{40}$ [$\times 100$] |
| (a)(ii) | 35.5[0] | **3** | **M2** for $42.6[0] \div \left(1+\frac{20}{100}\right)$ or better<br>or **M1** for recognising 42.6[0] as 120[%] |
| (b) | 150 cao | **2** | **M1** for $\frac{500\times 2\times 15}{100}$ oe |
| (c)(i) | 7800 cao | **3** | **B2** for 7790 or 7785 to 7786<br>or **M1** for $21000\times\left(1-\frac{18}{100}\right)^5$ oe isw<br>If 0 or 1 scored, **SC1** for *their* 7785… seen and rounded correctly to nearest 100 |
| (c)(ii) | 9[.00…] | **3** | **M2** for $\sqrt[12]{\frac{42190}{15000}}$ or better<br>or **M1** for $15000\left(1+\frac{x}{100}\right)^{12}=[42190]$ |

**5** Last year Mukthar earned $18 900 .
He did not pay tax on $5500 of his earnings.
He paid 24% tax on his remaining earnings.

**(a) (i)** Calculate how much tax Mukthar paid last year.

*Answer(a)*(i) $ ..... [2]

**(ii)** Calculate how much Mukthar earned each month after tax had been paid.

*Answer(a)*(ii) $ ..... [2]

**(b)** This year Mukthar now earns $19 750.50 .

Calculate the percentage increase from $18 900.

*Answer(b)* ..... % [2]

**(c)** Mukthar has $1500 to invest in one of the following ways.

- **Account A** paying **simple** interest at a rate of 4.1% per year
- **Account B** paying **compound** interest at a rate of 3.3% per year

Which account will be worth more after **3 years** and by how much?

*Answer(c)* Account ..... by $ ..... [5]

**MARKING SCHEME:**

| | | | |
|---|---|---|---|
| | **(a) (i)** 3216 Final answer | **2** | **M1** for (18900 – 5500) × 0.24 oe |
| | **(ii)** 1307 Final answer | **2FT** | **FT** (18900 – *their* **(a)(i)**) ÷ 12 correctly evaluated<br>**M1** for (18900 – *their* **(a)(i)**) ÷ 12 |
| | **(b)** 4.5[%] nfww | **2** | **M1** for $\frac{19750.50\,[-18900]}{18900}\times 100$<br>or $\frac{19750.50-18900}{18900}$ |
| | **(c)** A by 31.05…<br>or 31.04 to 31.05<br>or 31.[0]<br>31.1[0] | **5** | **M1** for 1500 × 4.1/100 × 3 [+ 1500] oe<br>**M1** for 1500 × $1.033^3$ [– 1500] oe<br>**A1** for 1684.5 or 184.5 **or** 1653[.45..] or 153[.45..]<br>**and M1dep** for subtraction of *their* amounts or *their* interests |