

## Compound Interest Answers

- 1)
- (a)  $A = 6000(1.06)^{10}$  *(M1)(A1)*  
 $= 10745 \text{ (AUD)}$  *(A1)* *(C3)*
- (b)  $10745 - 5000$   
 $= 5745$  *(A1)*  
 $5000 \times 1.08 + 5745 \times 1.06$  *(M1)(M1)*  
 $= 11489.80$  *(A1)*  
 $= 11490 \text{ (to the nearest AUD)}$  *(A1)* *(C5)*
- 2)
- (a)  $I = 0.04 \times 2000 \times 18 = 1440 \text{ Euros}$  *(M1)(A1)*  
 Total amount  $= I + 2000 = 3440 \text{ Euros .}$  *(M1)(A1)* *(C4)*
- (b)  $2000 \left( 1 + \frac{0.036}{12} \right)^{18 \times 12}$  *(M1)(A1)*  
 $= 3819.72$  *(A1)*  
 $= 3820 \text{ Euros, to nearest Euro.}$  *(A1)* *(C4)*
- 3)
- (a)  $\$ 4000 / 0.4504 = 8880.99 \text{ Ringgit (8880 to 3 s.f.)}$  *(M1)(A1)* *(C2)*
- Note:** Allow 8881 (nearest Ringgit).
- (b)  $8880.99 \times (1.004\bar{3})^{30} - 8880.99$  *(M1)(A1)(A1)(M1)*  
 $= 1230.09$  *(A1)*
- Note:** Award *(M1)* for compound calculation, *(A1)* for multiplier, *(A1)* for 30 seen and *(M1)* for deducting principle.  
 Use of 1.0043 (no recurrence) is premature rounding: award at most *(M1)(A0)(A1)(M1)(A0)*, but final *(A1)* ft can be awarded below for 1220.
- $= 1230 \text{ Ringgit}$  *(A1)* *(C6)*
- Note:** Final *(A1)* is for rounding candidate's answer to nearest Ringgit.  
 This is awarded only if the interest is calculated.

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4)

(a)	$\frac{20\,000 \times 2 \times 8}{100} = 3\,200 \text{ Swiss francs}$ <p><i>Award (M1) for formula with correct values.</i></p>	(M1)(A1)	(C2)
(b)	$20\,000(1.0125)^{24} - 20\,000 =$ $= 6947.02 \text{ Swiss francs}$ <p>Principal = 26947.02 Swiss francs.</p> <p><i>(M1) for correct substituted formula, (A1) for correct values inserted. (A1) for 6947.02 and (A1) for adding back the 20 000. The last (A1) follows through from the previous answer.</i></p> <p><b>OR</b></p> $20\,000 (1.0125)^{24} =$ $26\,947.02 \text{ Swiss francs}$ <p><i>(M2) for correct substituted formula, (A1) for correct substitution, (A1) for correct answer.</i></p>	(M1)(A1) (A1) (A1)(ft)	(C4)
			<b>[6 marks]</b>

5)

(a)	<p>To double, interest = 3000</p> $3000 = \frac{3000 \times 4 \times n}{100}$ <p><i>For substituting into the simple interest formula n = 25 years (A1) for 3000 on one side of equation if not seen separately. For interest of 6000 award (M1)(A1)(ft) for answers of 50 years.</i></p>	(A1)	(C3)
(b)	$6000 = 3000 \left(1 + \frac{3.5}{200}\right)^{2n}$ <p><i>(M1) for substituting values into a compound interest formula, (A1) for correct values with a variable for the power.</i></p> <p>n = 20 years <i>If n used in formula instead of 2n, can allow as long as final answer is halved to get 20.</i></p>	(M1)(A1)	(A1) (C3)
			<b>[6 marks]</b>

## Compound Interest Answers

6)

	<p>(a) <math>FV = 8000 (1.0125)^{60}</math>  <i>(MI) for substituting in compound interest formula, (AI) for correct substitution</i></p> <p>€16857 only</p>	<p><i>(MI)(AI)</i></p>	
		<p><i>(AI)</i></p>	<p><i>(C3)</i></p>
	<p>(b) <math>8000 (1.0125)^n = 9058.17</math>  <i>(MI) for equating compound interest formula to 9058.17</i></p> <p><math>n = 10</math> correct answer only</p> <p>So 30 months, <b>(ft)</b> on their <math>n</math>  Award <b>(C2)</b> for 2.5 seen with no working</p>	<p><i>(MI)</i></p> <p><i>(AI)</i></p> <p><i>(AI)(ft)</i></p>	<p><i>(C3)</i></p>
		<p><b>[6 marks]</b></p>	

7)

<p><b>Q10.</b></p>	<p><b>Financial penalty (FP) applies in part (a) in this question.</b></p>		
<p><b>FP</b></p>	<p>(a) <math>2000(1.04)^{10}</math>  <i>(MI) for substitution into CI formula.  (AI) for correct substitution.</i>  2960</p> <p style="text-align: center;"><b>OR</b></p> <p><math>2000 \left(1 + \frac{8}{200}\right)^{10} - 2000</math>  <i>(MI) for substitution into CI formula  (AI) for correct substitution</i>  2960</p>	<p><i>(MI)(AI)</i></p> <p><i>(AI)</i></p>	
	<p>(b) <math>1500(1.078)^n = 3000</math>  <i>(MI) for correct substitution in CI formula, (MI) for 3000 seen.  <math>n = 10</math> years (<math>n = 9.23</math> years not accepted)</i></p> <p style="text-align: center;"><b>OR</b></p> <p><math>1500(1.078)^n - 1500 = 1500</math>  <i>(MI) for correct substitution in CI formula, (MI) for 1500 seen.  <math>n = 10</math> years (<math>n = 9.23</math> years not accepted)</i></p> <p style="text-align: center;"><b>OR</b></p> <p><i>(M2) for list or graph.</i>  <math>n = 10</math> years (<math>n = 9.23</math> years not accepted)</p> <p><i>If simple interest formula is used in both parts (a) and (b) then award (M0)(M0)(A0) in (a) and</i></p> <p>(b) <math>1500 = \frac{1500(7.8)n}{100}</math>  <i>(MI) for substitution in SI formula or lists, (AI) for correct substitution</i>  <math>n = 13</math>  Correct answer only.  If 9.23 seen without working award <b>(A2)</b>.</p> <p><i>If calculator notation is used in either part with correct unrounded answer award (AI)(d) only if (FP) is applied in (a) or (AP) in (b).  Otherwise (A2)(d) if penalty has already been applied in a previous question.</i></p>	<p><i>(MI)(MI)</i></p> <p><i>(AI)</i></p> <p><i>(MI)(MI)</i></p> <p><i>(AI)</i></p> <p><i>(M2)</i></p> <p><i>(AI)</i></p> <p><i>(MI)(AI)</i></p> <p><i>(AI)</i></p>	<p><i>(C3)</i></p> <p><i>(C3)</i></p>
		<p><b>[6 marks]</b></p>	

## Compound Interest Answers

8) (a)  $446.25 = \frac{C \times 2.5 \times 5}{100}$  (MI)

**Note:** Award (MI) for the simple interest formula with values from question.

$C = 3570 \text{ AUD}$  (AI) (C2)

(b)  $446.25 = 5000 \left( 1 + \frac{2.5}{2(100)} \right)^{2n} - 5000$  (MI)(AI)

**Notes:** Award (MI) for substitution into compound interest formula. Award (AI) for correct values.

$5446.25 = 5000 \left( 1 + \frac{2.5}{2(100)} \right)^{2n}$  (AI)

$n = 3.44$

$n = 3.5$  (AI)

**OR**

$5446.25 = 5000 (1.0125)^{2n}$  (AI)(MI)(AI)

**Notes:** Award (AI) for 5446.25 seen.  
Award (MI) for substitution into compound interest formula.  
Award (AI) for correct values.

$n = 3.44 \text{ years}$

$3.5 \text{ years required}$  (AI) (C4)

**Notes:** For incorrect substitution into compound interest formula award at most (MI)(A0)(AI)(A0)  
Award (A3) for 3.44 seen without working.  
Allow solution by lists. In this case  
Award (AI) for half year rate 1.25 % seen.  
(AI) for 5446.25 seen  
(MI) for at least 2 correct uses of multiplication by 1.0125  
 $5000 \times 1.0125 = 5062.5$  and  $5062.5 \times 1.0125 = 5125.78125$   
(AI)  $n = 3.5$   
If yearly rate used then award (A0)(AI)(MI)(A0)

[6 marks]