

## Compound Interest and Depreciation Past Paper Questions (MS)



Q1.

Question	Working	Answer	Mark	Notes
	$1200 \times 1.035^3$ Or $1200 \times 1.035 = 1242$ $1242 \times 1.035 = 1285.47$ $1285.47 \times 1.035 = 1330.46$	1330.46	3	M2 for $1200 \times 1.035^3$ A1 1330.46 – 1330.47 Or M1 $1200 \times 1.035$ M1(dep) for '1242' $\times 1.035$ and '1285.47' $\times 1.035$ A1 1330.46 – 1330.47 [SC: B1 for 42 or 84 or 126 or 1242 or 1284 or 1326 seen, if M0 scored]

Q2.

Paper 1MA1: 2F			
Question	Working	Answer	Notes
		8112	M1 for complete method, eg. A1 $7500 \times 1.04^2$ cao

Q3.

Paper 1MA1: 2H			
Question	Working	Answer	Notes
		8112	M1 for complete method, eg. $7500 \times 1.04^2$ A1 cao

Q4.

5MB1H 01 November 2015				
Question	Working	Answer	Mark	Notes
	$2500 + 2500 \times 3.5 \div 100 =$ $2500 + 87.50 = 2587.50$ $2587.50 + 2587.50 \times 3.5 \div$ $100 = 2587.50 + 90.5625$	2678.06	3	M1 for $2500 \times 1.035$ or $2500 + 2500 \times 0.035$ oe or for 2587.5(0) or 87.5(0) or 8750 or 2412.5(0) M1 (dep) for "2587.5" $\times 1.035$ or for "2587.5" + "2587.5" $\times 0.035$ or for "2578.5" + "90.56(25)" or for 2678 or 2678.1(0) or 2678.07 or 2678.06... A1 cao NB: if correct answer seen then ignore any extra years Alternative method: M2 for $2500 \times 1.035^n$ where $n \geq 2$ or for 2678 or 2678.07 or 2678.06... A1 cao

Q5.



Question	Answer	Mark	Mark scheme	Additional guidance
(a)	explanation	C1	<p>explanation eg should be 1.03, this is 30% (not 3%)</p> <p><b>Acceptable examples</b>                      Because 1.3 is 130%                      He is increasing it by 30%                      1.3 means 1.30, not 1.03                      He needs to put a 0 in front of the 3                      1.3 is the wrong decimal                      He should multiply by 0.03                      3% is 0.03, (not 1.3)</p> <p>His answer should be 154.5                      He is meant to increase it by 4.5, not by 45</p> <p><b>Not acceptable examples</b>                      Because he is increasing by 130%, not 3%                      He needs to find 1% and then times it by 3</p>	
(b)	$(150 \times 0.97 = 145.5)$	B1	for 0.97 (or $\frac{97}{100}$ or 97%) and 145.5	

Q6.

Question	Answer	Mark	Mark scheme	Additional guidance	
(a)	Ben (supported)	P1	shows how to work interest out for one year eg $2000 \times 0.025 (= 50)$ or $1600 \times 0.035 (= 56)$ or 150 or 168 or $2000 \times 1.025 (= 2050)$ or $1600 \times 1.035 (= 1656)$	Throughout accept figures $\pm 1$ pence which do not need to be presented in money notation (to 2dp) or with monetary symbols.	
		P1	shows compound interest calculation for one account eg $2050 \rightarrow 51.25$ or $2101.25 \rightarrow 52.53$ or $1656 \rightarrow 57.96$ or $1713.96 \rightarrow 59.99$ eg $2000 \times 1.025^3 (= 2153.78)$ or $1600 \times 1.035^3 (= 1773.95)$		Award mark for a correct process shown, for which these figures can be taken as implying the process.
		P1	shows complete compound interest calculation for both accounts eg $2000 \times 1.025^3 (= 2153.78)$ and $1600 \times 1.035^3 (= 1773.95)$ OR one interest stated correctly eg 153.78 or 173.95		As above, award mark for both correct processes shown for both accounts, which these figures can be taken as implying the process.
		C1	Ben (shares) supported by 153.78 and 173.95		Accept an answer of "shares".



(b)	conclusion	C1	<p>conclusion (ft) eg no change, shares now 182.5...</p> <p><b>Acceptable examples</b> no since shares/Ben now 182.5</p> <p>Still Ben since <math>182.5 &gt; \text{Ali}</math></p> <p>No; he only gets 8.57 more</p> <p>No; he gets 68.56 instead of 59.98 (3<sup>rd</sup> yr) No; Ben already gets more interest, he would just get even more</p> <p><b>Not acceptable examples</b> no</p> <p>shares now 182.5</p> <p>Still Ben since less than Ali</p> <p><math>182.5 &gt; 153.78</math></p> <p>no; he needs 20.17 more</p>	<p>Conclusion needs to be supported. ft is from part (a); calculations carried out as part of (b) need to be correct for the comparison to be valid.</p>
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Q7.

Question	Answer	Mark	Mark scheme	Additional guidance
	12272.70 12272.71 or 12272.72	M1	for evidence of using a correct first step eg $200000 \times 0.015 (= 3000)$ or $200000 \times 1.015 (= 203000)$	values may be rounded or truncated to 2 dp
		M1	for evidence of a compound interest method eg $203000 \times 0.015 (= 3045)$ or $203000 \times 1.015 (= 206045)$ or $206045 \times 0.015 (= 3090.675)$ or $206045 \times 1.015 (= 209135.675)$ or $209135.675 \times 0.015 (= 3137.035\dots)$  or $209135.675 \times 1.015 (212272.710\dots)$ or $200000 \times 1.015^t, t \geq 2$	
		A1	for 12272.7(0) or 12272.71 or 12272.72  SC B2 for 212272.7(0) or 212272.71 or 212272.72	

Q8.

Question	Answer	Mark	Mark scheme	Additional guidance
	7318.15	M1	for a correct first step eg working out increase for one year $7000 \times (100 + 3) \div 100 (= 7210)$ oe or $7000 \times 3 \div 100 (= 210)$ oe or find the multiplier for both years eg $(100 + 3) \div 100 \times (100 + 1.5) \div 100 (= 1.04545)$	7315 or 315 implies M1
		M1	for a compound method, eg $7000 \times (100 + 3) \div 100 \times (100 + 1.5) \div 100$ oe or "7210" $\times 1.5 \div 100$ or $(= 108.15)$ oe	318.15 implies M1M1A0
		A1	cao	

Q9.



Question	Working	Answer	Notes
(a)	$1560000 \times (1.052)^2$	1730000	P1 for process to find population in 2016 P1 for complete process to find population in 2017 A1 for 1725000 - 1730000
(b)(i)		2020	P1 for process to find when population will exceed 2 000 000 A1 for 2020
(ii)			C1 for correct comment on how assumption will affect the answer, eg if the percentage growth is higher the population may exceed 2 000 000 earlier.

Q10.

Question	Working	Answer	Mark	Notes
		253 484.16	M1  M1  A1	for a method to find the value at the end of year 1, e.g. $235\,000 \times 0.96$ (= 225 600)  (dep M1) for a complete method to find the value at the end of 3 years, e.g. " $225\,600$ " $\times 1.06^2$  cao

Q11.

Question	Working	Answer	Mark	Notes
		Secure Bank (supported)	P1  P1  C1	for a process to work out the interest after one year e.g. $0.02 \times 25000$ (=500) or $0.043 \times 25000$ (=1075) or for 1.02 or 25500 or 1.043 or 26075  for process to find value of the investment after 3 years or the multiplicative factor for 3 years at one of the banks, e.g. $25000 \times 1.02 \times 1.02 \times 1.02$ oe (= 26530...) or $1.02^3$ (= 1.0612...) or $25000 \times 1.043 \times 1.009 \times 1.009$ oe (= 26546...) or $1.043 \times 1.009 \times 1.009$ (= 1.0618.....) [accept total interest of 1530.. or 1546.. if final values of investment are not found] for Secure Bank from correct figures, eg. 26530.. and 26546.. or 1530... and 1546... or 1.0612... and 1.0618...



Q12.

Question	Working	Answer	Mark	Notes
(a)		Lauren £9537.20 £9545	P1	process to find the value of one car at the end of one year, e.g. $13995 \times 0.88$ or $14495 \times 0.87$
			P1	process to find the value of one car at the end of 3 years, e.g. $13995 \times (0.88)^3$ or $14495 \times (0.87)^3$
			P1	complete process to find the value of both cars at the end of 3 years, e.g. $13995 \times (0.88)^3$ and $14495 \times (0.87)^3$
			C1	£9537.20(064) and £9545(.000985) and Lauren
(b)		Explanation	C1	appropriate explanation, e.g. explanation that her car will be worth less

Q13.

Paper: 5MB3H_01				
Question	Working	Answer	Mark	Notes
		2700	3	M1 for a correct method to find 25% of 4800 (= 1200) M1 for a fully complete and correct method to find the value of the car at the end of 2015 A1 cao  OR  M2 for $4800 \times (0.75)^2$ A1 cao

Q14.

	Working	Answer	Mark	Notes
	$1200 \times 0.8^4$	4	3	M1 0.8 or 960 or 2160 seen M1 for $0.8^n$ where $n$ is 2 or greater or for 768 or 614.40 A1 cao and supported by working

Q15.



	Working	Answer	Mark	Notes
	$20\,000 \times 0.85 = 17\,000$ $17\,000 \times 0.9 = 15\,300$ $15\,300 \times 0.9 = 13\,770$	3	4	M1 for a complete correct method to find 15% of 20 000 (=3000) or 100-15 (=85) M1 for a complete correct method to find 85% of 20 000 e.g. 20 000 – '3000' (=17000) or 20 000 × '0.85' (=17000) M1 for a complete method to find 90% of '17 000' A1 cao but MUST be supported: 3 without working scores 0 marks and 3 from incorrect working may gain some method marks.

Q16.

5MB3H/01 June 2015				
Question	Working	Answer	Mark	Notes
		0.84	3	M2 for $2 \times 0.75^3$ (M1 for $2 \times 0.75 (=1.5)$ or $2 \times 0.25 (=0.5)$ and $2 - "0.5"$ ) A1 for 0.84 – 0.844

Q17.

Question	Answer	Mark	Mark scheme	Additional guidance
	12 508.7(0)	P1	for start of process to find interest rate for year 1 eg $12336 \div 12000 (=1.028)$ or $(12336 - 12000) \div 12000 (=0.028)$ <b>OR</b> forms a suitable equation, eg $12000 \times (1 + \frac{x}{100}) = 12336$	Rate of interest = 2.8, or $x = 2.8$ implies P2
		P1	for complete process to find the interest rate for year 1 eg $(“1.028” - 1) \times 100 (=2.8)$ or $“0.028” \times 100 (=2.8)$ <b>OR</b> correct process to solve correct equation eg $(12336 - 12000) \div 120 (=2.8)$	
		P1	for complete process to find the value at the end of 2 years eg $(“2.8” \div 2 + 100) \div 100 \times 12336$	
		A1	accept 12508.7 to 12508.71 or 12509	12509 must come from correct working

Q18.



Question	Working	Answer	Mark	Notes
		8.3	3	M1 $0.5 = r^8$ or $0.5 = (1 - \frac{x}{100})^8$ M1 $\sqrt[8]{0.5}$ can be implied by 0.917(...) seen A1 8.29 – 8.3