core:maths
A NEW QUALIFICATION FOR WORK, STUDY & LIFE

Homework 12 – Solutions

Godalming College

1)

on	Solution	Marks	Total	Comments
(a)	interest is 0.35% or 0.0035 of initial amount 1.0035 adds the original amount	E1	1	

N	A_n
0	0
1	200.70
2	402.10
3	604.21
4	807.02
5	1010.54 [accept 1010.55]
6	1214.78[accept 1214.79]

(b)	as above;	B1 B1 B1 B1	4	row 2 row 3 row 4 condone 807.03 row 5, 6 delete 1 mark for amounts not in pence
(c)	$A_n = 1.0015\,(A_{n-1} + 500)$	B1 B1	2	1.0015 500 and fully correct B1 if not given LHS of equation
	Total		**7**	

7

2)

	Solution	Mark	Total	Comment
(a)	$1200 = \frac{1500}{(1+i)^3}$	M1		
	$(1+i)^3 = \frac{1500}{1200}$			
	$= 1.25$			
	$1+i = \sqrt[3]{1.25}$	m1		
	$i = 0.077217..$	A1		
	Interest rate is 7.72%	A1	4	7.7% Lose last A mark
(b)	$\frac{R}{1.11} + \frac{R}{1.11^2} + \frac{R}{1.11^3} = 1200$	M1		
	$3.3421\,R = 1200 \times 1.11^3$	M1A1		3.3421 R – 1641.16
	Amount is £491.06	A1	4	Accept 491.05
	Total		**8**	

8

3)

stion	Solution	Mark	Total	Comment
(a)	Cost for both is €64	B1	3	
	Service charge is $\frac{15}{100} \times$ €64	M1		M1 $\frac{15}{100} \times$ €32 or €4.80 Needs doubling for B1 €36.80 is M1 B0 A1
	= €9.60			
	Total cost is €73.60	A1		€73.6 is accepted M1A1 36.80
(b)	€84 is 112% of cost of dinner	B1	3	Only if used correctly
	Service charge is € $\frac{84}{112} \times 12$	M1		or for € $\frac{84}{1.12} = 75$
	= €9	A1		CAO If for one person £4.50 SC2
(c)	Cost is £ $\frac{180}{1.28}$	M1	3	
	= £140.625	A1		
	= £140.62 or £140.63	A1		NB $\frac{1}{1.28} = 0.78125$ 0.78125 ×180 = 140.625 gains full marks **but** use of this with 0.78 × 180 gains M1 only
	Total		**9**	

9

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4)

	Solution	Mark	Total	Comment
(a)	£4035 × 12 = £48,420	**B1**		
	Taxable income is £48.420 − £8,105 = £40,315	**M1, A1**	3	
(b)	20% tax is £37,500 × 0.2 = £7,500	**M1, A1**		
	40% tax is charged on £40,315 − £37,500 = £2,815	**M1 A1**		
	Tax at 40% is £2,815 × 0.4 = £1,126			
	Annual tax paid is £8,626	**A1**	5	
	Total		7	

7

5)

(a)	Milk	B1	
(b)	The price had stayed the same	B1	oe
(c)	80 × 1.2	M1	oe
	96	A1	oe SC1 0.96 (p) or £ 96

4

6)

	Solution	Mark	Total	Comment
	Pays NI on £215 − 183 = £32	**M1, A1**		
	NI is £32 × 12% = £3.84 per week	**M1, A1**	4	
	Total		4	

4

7)

(a)	$\bar{x} = 2.96$ or 2.97 $\sigma_n = 0.163$	**B1** **B2**	accept 2.96 or better accept $\sigma_{n-1} = 0.173$ B1 for 0.16 B1 for 0.17
(b)	Each Pendragon share costs roughly twice each Woolworths share or mean of Pendragon Shares is greater	**B1**	Higher or lower
	Woolworths share prices are more spread out than those of Pendragon.	**B2**	B1 range is bigger B1 s.d is higher or lower
	TOTAL	**6**	

6

8)

(a)	$\pi \times 8$	M1		8π = M1 or $2 \times \pi \times 4$
	any number between 25.1 to 25.133 inclusive	A1	2	25 = SC1
(b)	$\pi \times 6 \times 6$ OR $\pi \times 2.25 \times 2.25$ their 113.08 – their 15.90	M1 m1		
	any number between 97.1 to 97.2 inclusive	A1	3	97 (with no working) = SC2
)(i)	$2 \times \pi \times 6 \times 7$ any number between 263.76 to 264 inclusive	M1 A1	2	

7

TOTAL: 52