MATHEMATICS - NUMERACY 2nd SAMs 2017 Unit 2 (Calculator allowed) Intermediate Tier	Mark	MARK SCHEME Comments (Page 1)
1. Use of 30 teabags (for £1.80)	B1	
Method to compare, e.g. multiples of 30 & 40: 30, 60, 90, 120 & 40, 80, 120	M1	OR equivalent, e.g. 1 or 10 teabags considered for both bags of 30 & 40
4 × 1.8(0) and 3 × 2.60	m1	OR 1(.)80 ÷ 3(0) and 2(.)60 ÷ 4(0) with consistent place value to compare OR 60(p for 10) and 65(p for 10) with consistent place value to compare OR 60(p for 10) and (£) 2(.)60 – (£)1(.)80 = 80p for extra 10 OR 2.40 for 40 OR 1.80 ÷ 30 × 40 OR 1.80 ÷ 3 × 4 OR 60(p) for 10 and 80(p) for extra 10.
(£)7.2(0) and (£)7.8(0) or equivalent	A1	
Offer A (20 teabags + 50% free) is better value	E1	Depends on M1, m1 awarded with appropriate FT Accept answers suggesting 'depends if you need 40 teabags exactly' etc. provided M1, m1, A1 previously awarded. *SC1 for an answer based on comparison of 20 teabags for £1.80 with 40 teabags for £2.60, appropriate working with conclusion of 40 teabags*
	5	
2.(a) 150	B1	
(b) 325	B1	
	2	
3.(a) 7cm (± 0.2cm) × 8 (÷ 100)	M1	Award M1 only for answers 56cm or 56m or 56 or similar from ± 0.2cm tolerance
0.56 (m)	A1	
(b) Measuring 2 appropriate angles (±2°) to check interior (allied), or appropriate corresponding or alternate angles	B1	The size of angles may not actually be recorded, e.g. on diagram equal angles marked *x* and *y*.
Conclusion based on the angles measured and accurate knowledge of parallel line angle facts.	E1	Accept references to the angles which are equal or sum to 180° Do not accept 'travelling in the same direction so won't meet'
	4	

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4.(a) £480	B1	
(b) £1620	B1	
(c)(i) Paying for 10m	B1	If *not awarded, FT use of 9m throughout*
11×1mth (11×10×40×1.2 =) (£)5280 AND 12mth charge (320×10×1.2 =) (£)3840	B2	B1 for either correct, or if neither correct award for excluding VAT charges of (£)4400 **and** (£)3200 respectively
6mth + 5×1mth 180×10 + 5×40×10 (×1.2) (£)4560	M1 A1	Accept excluding VAT (£3800)
Conclusion to pay annual charge based on the calculation of all 3 possibilities	E1	FT appropriate conclusion depending on the sight of any two of the 3 correct charges given including VAT *If misread not using 'per metre' consistently, hence MR-1, then B0, then FT throughout*
Organisation and communication Accuracy of writing	OC1 W1	
(ii) Greatest saving (£5280 - £3840 =) (£)1440	B1 11	FT their least of 3 possibilities subtracted correctly from their greatest of 3 possibilities
5.(a) 5·5 (metres)	B1	Accept answers in the range 5.4 to 5.6 inclusive
(b) Intention to read horizontal scale for depth of 3m filling 36 (minutes)	M1 A1	Accept sight of 0.6 (hours)
(c) 13(:)36 or 1 36 pm AND 18(:)36 or 6 36 pm	B2	B1 for either correct, or B1 if both given with incorrect time notation or B1 for two times given that are 5 hours apart e.g. 14:36 and 19:36, i.e. FT 'their first time' + 5 hours for second B1.
(d) 4th statement identified	B1 6	B0 if more than one statement identified.
6.(a) 9 × 10 + 160 = 250 or equivalent 50(°F)	M1 A1	
(b) 9c = 5f – 160 c = $\frac{5f – 160}{9}$ or c = $\frac{5}{9}$(f – 32)	B1 B1 4	FT until 2nd error
7. (a)(i) 253(°)	B1	
(ii) 360 – 42 = 318(°)	M1 A1	*SC1 for answers of 073(°) and 138(°) in (i) and (ii)*
(b) 60° with construction arcs	M1	Accept anywhere on the line *Allow sight of construction arcs for 60°*
(30° by) bisecting 'their angle', with arcs shown Correct 30° from appropriate construction with line shown at the right hand end of the given line	M1 A1 6	Line (road) may not be shown Depends on both M marks

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8.(a) $2 \times (8.5 + 4.6) + 4 \times 2.2$ (+ 18) and no others	M2	Or equivalent. Attempt to consider all 6 faces *or* all 8 lengths (+ 18) M1 for omitting one dimension OR for adding all three dimensions with at least one multiplied by 2 or 4.
= 53 (cm)	A1	CAO. *An answer of 35 implies M2A0.*
(b) $2 \times l + 2 \times w + 4 \times h + 18$ (cm) or equivalent (and no extras)	B2	B1 for 1 error or 1 slip in notation. Treat an answer of $l + w + 4 \times h + 18$ as 1 error (omitting bottom), hence award B1. If B2 penalise extra incorrect working -1
	5	
9.(a) 250×4.37	M1	
= 1092.5(0)	A1	
(Buys)1050 (zloty)	A1	FT provided M1 awarded
$1050 \div 4.37$	M1	FT 'their 1050 zloty' provided rounded to the nearest 50. Must be in zloty not £s.
= (£)240.27(46)	A1	
(b) (1050 – 340.40 =) 709.6(0)	B1	FT 'their (a)' provided >340.40
$709 \div 4.43$	M1	FT rounding down their 709.60 to whole number
(£) 160.05	A1	Accept (£)160.04 but not (£)160.045 An answer of (£)160.18 (omitting to round down) should be awarded B1 then SC1 in (b). An answer of (£)160.27 (rounding up instead of down) should be awarded SC1, with B1 if 709.6(0) seen.
	8	
10. 400×1.01^{14} or equivalent full method	M2	M1 for correctly multiplying by 1.01^n where n is a positive integer.
(£)459.79	A1	Award M2A0 for (£)459.789(685...)
	3	
11.(a) $50\,000 \div 0.35 =$	M1	
142857	A1	
(b) (Total power in MW is) $2.0 \times 30 + 3.5 \times 54 + 3.6 \times 25 + 3.0 \times 60$ (Total number of turbines 30+54+25+60 = 169) (Mean full power of a turbine is)	M1	($\Sigma fx = 60+189+90+180 = 519$)
$519 \div 169$	m1	FT 'their Σfx' $\div$ 'their 517'
3.07(1…. MW)	A1	CAO. Do not accept 3.1 or 3 (MW)
(At 45% power) $0.45 \times 3.07(….)$ or equivalent	m1	FT 'their 3.07(…)' provided M1, m1 previously awarded
1.38 (MW)	A1	Their answer must be given correct to 2 decimal places, i.e. award M1A0 for 1.381(95...) or 1.3815 or 1.382. *Alternative:* *(45% power) 0.45×2, 0.45×3.5, 0.45×3.6, 0.45×3* M1 *0.9×30 + 1.575×54 + 1.62×25 + 1.35×60* m1 *233.55 (MW)* CAO A1 *÷169* m1 *1.38 (MW)* A1
	7	

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12. (a) 0, 5, 25, 49, 83, 113, 120	B2	B1 for any three correct values, OR FT from 1 error for finding 3 further cumulative values accurately
(b) 3 unique vertical plots correct at upper bounds All plots correct and joined, including to 0 at t=2.5	M1 A1	Only FT their <u>cumulative table</u> to (c) *Accuracy of plotting: time on the grid line, cumulative frequency within the appropriate square with 1st & last plots on the grid lines*
(c) Use of 15 minutes Conclusion: Target beaten by $2\frac{1}{2}$ minutes	M1 A1	

(d) TRUE
         FALSE
    TRUE
 	
    TRUE
         FALSE
	B2	B1 for any 4 correct
		FT their cumulative frequency diagram
		CAO
		CAO
		FT their cumulative frequency diagram
		CAO

	8	
13.(a) Form and use a right-angled triangle with base 55cm and height 50 cm. Tan x = 50/55 42(°) or 42.3(°)	S1 M1 A3	Or alternative FULL method. A2 for 42.27….(°) A1 for tan⁻¹ 0.909… or tan⁻¹ (50/55)
(a) Reason, e.g. 'original measurements may not have been accurate', or 'doesn't consider the thickness of the wood', …	E1	
	6	

14. Attempt to use Pythagoras' Theorem, e.g. $length^2 + width^2 = 2.5^2$
Use of length = 2 × width
$(2 × width)^2 + width^2 = 2.5^2$ or equivalent
     $width^2$ = 1.25 or width = $\sqrt{1.25}$
          Width 1.1(2 metres) or 1.118(03… metres)
	M1
	
	M1
	m1
	m1
	A1
		OR equivalent. If units are given they must be correct.
		
		Alternative:
		Attempt to use Pythagoras' Theorem,
		e.g. $length^2 + width^2 = 2.5^2$ *M1*
		Use of length = 2 × width *M1*
		Trial of a pair of values(< 2.5), one double the other in Pythagoras' Theorem
		m1
		Trial of a pair of values(< 2.5), one double the other in Pythagoras' Theorem with improvement, closer to 2.5m
		m1
		Width 1.1 metres or equivalent *A1*

	5	