

MATHEMATICS - NUMERACY 2nd SAMs 2017 Unit 2 (Calculator allowed) Intermediate Tier	Mark	MARK SCHEME Comments (Page 1)
<p>1. Use of 30 teabags (for £1.80) Method to compare, e.g. multiples of 30 & 40: 30, 60, 90, 120 & 40, 80, 120 $4 \times 1.8(0)$ and 3×2.60</p> <p>(£)7.2(0) and (£)7.8(0) or equivalent</p> <p>Offer A (20 teabags + 50% free) is better value</p>	<p>B1 M1 m1 A1 E1 5</p>	<p>OR equivalent, e.g. 1 or 10 teabags considered for both bags of 30 & 40 OR $1(.).80 \div 3(0)$ and $2(.).60 \div 4(0)$ 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 $1.80 \div 30 \times 40$ OR $1.80 \div 3 \times 4$ OR 60(p) for 10 and 80(p) for extra 10.</p> <p>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.</p> <p><i>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</i></p>
<p>2.(a) 150 (b) 325</p>	<p>B1 B1 2</p>	
<p>3.(a) $7\text{cm} (\pm 0.2\text{cm}) \times 8 (\div 100)$ 0.56 (m)</p> <p>(b) Measuring 2 appropriate angles ($\pm 2^\circ$) to check interior (allied), or appropriate corresponding or alternate angles</p> <p>Conclusion based on the angles measured and accurate knowledge of parallel line angle facts.</p>	<p>M1 A1 B1 E1 4</p>	<p>Award M1 only for answers 56cm or 56m or 56 or similar from $\pm 0.2\text{cm}$ tolerance</p> <p>The size of angles may not actually be recorded, e.g. on diagram equal angles marked x and y.</p> <p>Accept references to the angles which are equal or sum to 180° Do not accept 'travelling in the same direction so won't meet'</p>

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<p>4.(a) £480 (b) £1620</p> <p>(c)(i) Paying for 10m</p> <p>11x1mth (11x10x40x1.2 =) (£)5280 AND 12mth charge (320x10x1.2 =) (£)3840</p> <p>6mth + 5x1mth 180x10 + 5x40x10 (x1.2) (£)4560</p> <p>Conclusion to pay annual charge based on the calculation of all 3 possibilities</p> <p>Organisation and communication Accuracy of writing</p> <p>(ii) Greatest saving (£5280 - £3840 =) (£)1440</p>	<p>B1 B1</p> <p>B1</p> <p>B2</p> <p>M1 A1</p> <p>E1</p> <p>OC1 W1</p> <p>B1</p> <p>11</p>	<p><i>If not awarded, FT use of 9m throughout</i></p> <p>B1 for either correct, or if neither correct award for excluding VAT charges of (£)4400 and (£)3200 respectively</p> <p>Accept excluding VAT (£3800)</p> <p>FT appropriate conclusion depending on the sight of any two of the 3 correct charges given including VAT</p> <p><i>If misread not using 'per metre' consistently, hence MR-1, then B0, then FT throughout</i></p> <p>FT their least of 3 possibilities subtracted correctly from their greatest of 3 possibilities</p>
<p>5.(a) 5.5 (metres)</p> <p>(b) Intention to read horizontal scale for depth of 3m filling 36 (minutes)</p> <p>(c) 13(:)36 or 1 36 pm AND 18(:)36 or 6 36 pm</p> <p>(d) 4th statement identified</p>	<p>B1</p> <p>M1</p> <p>A1</p> <p>B2</p> <p>B1</p> <p>6</p>	<p>Accept answers in the range 5.4 to 5.6 inclusive</p> <p>Accept sight of 0.6 (hours)</p> <p>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. B0 if more than one statement identified.</p>
<p>6.(a) $9 \times 10 + 160 = 250$ or equivalent 50(°F)</p> <p>(b) $9c = 5f - 160$ $c = \frac{5f - 160}{9}$ or $c = \frac{5}{9}(f - 32)$</p>	<p>M1 A1</p> <p>B1 B1</p> <p>4</p>	<p>FT until 2nd error</p>
<p>7. (a)(i) 253(°)</p> <p>(ii) $360 - 42 = 318(°)$</p> <p>(b) 60° with construction arcs</p> <p>(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</p>	<p>B1</p> <p>M1 A1</p> <p>M1</p> <p>M1 A1</p> <p>6</p>	<p><i>SC1 for answers of 073(°) and 138(°) in (i) and (ii)</i></p> <p>Accept anywhere on the line <i>Allow sight of construction arcs for 60°</i> Line (road) may not be shown Depends on both M marks</p>

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<p>8.(a) $2 \times (8.5 + 4.6) + 4 \times 2.2$ (+ 18) and no others</p> <p style="text-align: center;">= 53 (cm)</p> <p>(b) $2 \times l + 2 \times w + 4 \times h + 18$ (cm) or equivalent (and no extras)</p>	<p>M2</p> <p>A1</p> <p>B2</p> <p>5</p>	<p>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.</p> <p>CAO. An answer of 35 implies M2A0.</p> <p>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</p>
<p>9.(a) 250×4.37 = 1092.5(0) (Buys)1050 (zloty)</p> <p>$1050 \div 4.37$ = (£)240.27(46)</p> <p>(b) $(1050 - 340.40) = 709.6(0)$ $709 \div 4.43$ (£) 160.05</p>	<p>M1 A1 A1</p> <p>M1 A1</p> <p>B1 M1 A1</p> <p>8</p>	<p>FT provided M1 awarded</p> <p>FT 'their 1050 zloty' provided rounded to the nearest 50. Must be in zloty not £s.</p> <p>FT 'their (a)' provided >340.40 FT rounding down their 709.60 to whole number 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.</p>
<p>10. 400×1.01^{14} or equivalent full method</p> <p style="text-align: center;">(£)459.79</p>	<p>M2</p> <p>A1</p> <p>3</p>	<p>M1 for correctly multiplying by 1.01^n where n is a positive integer. Award M2A0 for (£)459.789(685...)</p>
<p>11.(a) $50\,000 \div 0.35 =$ 142857</p> <p>(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) $519 \div 169$ 3.07(1.... MW)</p> <p>(At 45% power) $0.45 \times 3.07(\dots)$ or equivalent 1.38 (MW)</p>	<p>M1 A1</p> <p>M1</p> <p>m1 A1</p> <p>m1 A1</p> <p>7</p>	<p>($\Sigma fx = 60 + 189 + 90 + 180 = 519$)</p> <p>FT 'their Σfx' \div 'their 517' CAO. Do not accept 3.1 or 3 (MW)</p> <p>FT 'their 3.07(...)' provided M1, m1 previously awarded Their answer must be given correct to 2 decimal places, i.e. award M1A0 for 1.381(95...) or 1.3815 or 1.382.</p> <p><i>Alternative:</i> (45% power) $0.45 \times 2, 0.45 \times 3.5, 0.45 \times 3.6,$ 0.45×3 M1 $0.9 \times 30 + 1.575 \times 54 + 1.62 \times 25 + 1.35 \times 60$ m1 233.55 (MW) CAO A1 $\div 169$ m1 1.38 (MW) A1</p>

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<p>12. (a) 0, 5, 25, 49, 83, 113, 120</p> <p>(b) 3 unique vertical plots correct at upper bounds All plots correct and joined, including to 0 at t=2.5</p> <p>(c) Use of 15 minutes</p> <p>Conclusion: Target beaten by $2\frac{1}{2}$ minutes</p> <p>(d) TRUE FALSE TRUE TRUE FALSE</p>	<p>B2</p> <p>M1 A1</p> <p>M1 A1</p> <p>B2</p> <p>8</p>	<p>B1 for any three correct values, OR FT from 1 error for finding 3 further cumulative values accurately</p> <p>Only FT their cumulative table to (c) <i>Accuracy of plotting: time on the grid line, cumulative frequency within the appropriate square with 1st & last plots on the grid lines</i></p> <p>B1 for any 4 correct FT their cumulative frequency diagram CAO CAO FT their cumulative frequency diagram CAO</p>
<p>13.(a) Form and use a right-angled triangle with base 55cm and height 50 cm. Tan $x = 50/55$ $42(^{\circ})$ or $42.3(^{\circ})$</p> <p>(a) Reason, e.g. 'original measurements may not have been accurate', or 'doesn't consider the thickness of the wood', ...</p>	<p>S1</p> <p>M1 A3</p> <p>E1</p> <p>6</p>	<p>Or alternative FULL method. A2 for $42.27\dots(^{\circ})$ A1 for $\tan^{-1} 0.909\dots$ or $\tan^{-1} (50/55)$</p>
<p>14. Attempt to use Pythagoras' Theorem, e.g. $\text{length}^2 + \text{width}^2 = 2.5^2$ Use of $\text{length} = 2 \times \text{width}$ $(2 \times \text{width})^2 + \text{width}^2 = 2.5^2$ or equivalent $\text{width}^2 = 1.25$ or $\text{width} = \sqrt{1.25}$ Width 1.1(2 metres) or 1.118(03... metres)</p>	<p>M1</p> <p>M1 m1 m1 A1</p> <p>5</p>	<p>OR equivalent. If units are given they must be correct.</p> <p><i>Alternative:</i> <i>Attempt to use Pythagoras' Theorem, e.g. $\text{length}^2 + \text{width}^2 = 2.5^2$</i> M1 <i>Use of $\text{length} = 2 \times \text{width}$</i> M1 <i>Trial of a pair of values (< 2.5), one double the other in Pythagoras' Theorem</i> m1 <i>Trial of a pair of values (< 2.5), one double the other in Pythagoras' Theorem with improvement, closer to 2.5m</i> m1 <i>Width 1.1 metres or equivalent</i> A1</p>