

MATHEMATICS 2nd SAMs 2017 Unit 2 (Calculator allowed) Higher Tier	Mark	MARK SCHEME Comments (Page 3)									
<p>10. (a) $x = 0.49191\dots$ and $100x = 49.19191\dots$ with an attempt to subtract, OR equivalent (e.g. $1000x - 10x$)</p> $\frac{487}{990}$ <p>(b) False, AND a correct reason e.g. 'a needs to be a cube number for it to yield an integer' or a counter-example e.g. $6^{\frac{2}{3}} = \sqrt[3]{36}$ and 36 is not a cube number.</p> <p>(c) (i) $10\sqrt{2}$ (ii) $4\sqrt{5}$</p>	<p>M1</p> <p>A1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>5</p>	<p>OR 48.7 / 99</p> <p>Mark final answer.</p>									
<p>11. $\frac{40}{260} \times$ the number of employees in any category.</p> <table border="1" data-bbox="150 869 608 965"> <thead> <tr> <th></th> <th>Male</th> <th>Female</th> </tr> </thead> <tbody> <tr> <td>Full-time</td> <td>19</td> <td>5</td> </tr> <tr> <td>Part-time</td> <td>3</td> <td>13</td> </tr> </tbody> </table>		Male	Female	Full-time	19	5	Part-time	3	13	<p>M1</p> <p>A2</p> <p>3</p>	<p>A1 for any 2 or 3 correct answers.</p>
	Male	Female									
Full-time	19	5									
Part-time	3	13									
<p>12. (a) Tangent drawn Idea of increase in y / increase in x Gradient from a reasonable tangent m/s^2 OR ms^{-2}</p> <p>(b) Split into 6 areas and attempt to sum (Area =) $\frac{1}{2} \times 10(0+2 \times 10+2 \times 30+2 \times 32+2 \times 33+2 \times 39+40)$ $= 1640(m)$</p>	<p>S1</p> <p>M1</p> <p>A1</p> <p>U1</p> <p>M1</p> <p>M1</p> <p>A1</p> <p>7</p>	<p>Or equivalent. Award for up to 1 error in reading scale. CAO.</p>									
<p>13. ($l^2 =$) $10^2 + 5^2$ $l^2 = 125$ OR $(l =) \sqrt{125}$ $(l =) 11.1(803\dots)$ or 11.2 (Surface area =) $\pi \times 5 \times 11.1(803\dots) + 2\pi \times 5 \times 8 + \pi \times 5^2$ $= 505$ to 506 (cm^2)</p>	<p>M1</p> <p>A1</p> <p>A1</p> <p>M2</p> <p>A1</p> <p>6</p>	<p>FT 'their l'. M1 for any 2 of the 3 terms.</p>									
<p>14. (a) $3(x + 1) - 5(2x - 1)$ as numerator AND $(2x - 1)(x + 4)$ as denominator. OR multiply throughout by $(2x - 1)$ and $(x + 4)$ $3(x + 4) - 5(2x - 1) = 6(2x - 1)(x + 4)$ $0 = 12x^2 + 49x - 41$</p> <p>(b) $x = \frac{-49 \pm \sqrt{49^2 - 4 \times 12 \times (-41)}}{2 \times 12}$</p> $x = \frac{-49 \pm \sqrt{4369}}{24}$ <p>$x = 0.71$ and $x = -4.80$</p>	<p>M2</p> <p>A1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>A1</p> <p>7</p>	<p>Brackets required or implied later. M1 for either correct numerator or denominator, or multiply throughout with 1 error.</p> <p>Convincing i.e. need to see at least $12x^2 + 42x - 24$ Allow one error, in sign or substitution, but not in the formula.</p> <p>CAO.</p> <p>CAO.</p>									

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15. Use of $\frac{1}{2}ab\sin C$ followed by cosine rule $24 \cdot 25 = \frac{1}{2} \times 12 \cdot 7 \times AD \times \sin 132^\circ$ $AD = (2 \times 24 \cdot 25) / (12 \cdot 7 \times \sin 132^\circ)$ $AD = 5 \cdot 13(883\dots)$ or $5 \cdot 14$ (cm) $DB^2 = 12 \cdot 7^2 + AD^2 - 2 \times 12 \cdot 7 \times AD \times \cos 132^\circ$ $DB^2 = 275 \cdot 036\dots$ $DB = 16 \cdot 5(842\dots)$ or $16 \cdot 6$ (cm)	S1 M1 m1 A1 M1 A1 A1 7	FT provided M1 awarded. <i>Alternative solution (using a new point E which is vertically above D):</i> $DE = \text{area} / 12 \cdot 7 = 3 \cdot 819(\text{cm})$ S1 $AE = DE / \tan 48^\circ = 3 \cdot 439(\text{cm})$ M1 $BE = AE + AB = 16 \cdot 139(\text{cm})$ m1 <i>Using Pythagoras, $DE^2 + BE^2 =$</i> M1 $\qquad\qquad\qquad 275 \cdot 05$ A1 $BD = 16 \cdot 5(8\dots)$ or $16 \cdot 6$ (cm) A1