

GCSE MATHEMATICS  
 MARK SCHEME – Specimen Paper Unit 3 (Terminal) Higher Modular Section B  
 Issue 2

Questions	Working	Answer	Mark	Notes
<b>1</b>		3, 6, 6, 7.5	<b>2</b>	B2 all four correct (B1 for two correct)
<b>2</b>	$360^\circ \div 20^\circ =$	18	<b>2</b>	M1 $360 \div 20$ A1 cao
<b>3</b>		$14G + 121$	<b>2</b>	B2 cao (B1 for $14G$ )
<b>4</b>	$3.142 \times 20.9 = 65.6678$ (65.6-65.7) $65.6678 \div 2 = 32.8339$ (32.8 - 32.9) $32.8339 + 20.9 =$	53.7	<b>4</b>	M1 for $3.142 \times 20.9$ or $\pi \times 20.9$ or $3.142 \times 20.9/2$ or $\pi \times 20.7/2$ or 65.7 seen A1 for 32.8-32.9 seen for arc length B1 ft (indep) for “32.8” + 20.9 or 53.7-53.8 A1 for rounding to 53.7 NB: allow use of 3.14, 22/7 instead of 3.142
<b>5</b>	(a) $6^2 + 4.5^2 = 56.25$ $\sqrt{56.25} = 7.5$ (b) $6 \times 4.5 \div 2 = 13.5$ $13.5 \times 10$	7.5  135	<b>2</b>  <b>3</b>	M1 for $6^2 + 4.5^2$ A1 cao M1 for $6 \times 4.5 \div 2$ M1 (dep) for 13.5 A1 cao
<b>6</b>		$3x^5y^5$	<b>2</b>	B2 cao (B1 for $3x^?y^5$ or $3x^5y^?$ where ? is not 5)
<b>7</b>		3.2	<b>4</b>	B2 for a trial between 3.1 and 3.5 incl (B1 for a trial between 3 and 4 incl) B1 for a trial between 3.2 and 3.3 excl B1 for 3.2 (dep on at least B1)
<b>8</b>		$2^{\text{nd}}, 6^{\text{th}}, 7^{\text{th}}$	<b>3</b>	B3 (B1 for each, -1 each extra)

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<b>9</b>	<b>(a)</b> $84 \times 92.5 =$	£77.70	<b>3</b>	M2 $84 \times 92.5$ (M1 for $84 - (84 \times 7.5/100)$ A1 cao
	<b>(b)</b> $12\,000 \times 0.75 = 9000$ $9000 \times 0.75 = 6750$ $6750 \times 0.75 = 5062.5$	£5062.50	<b>3</b>	M1 for $12\,000 \times 0.75$ or sight of 9000 M1 for continued use of 0.75 (at least one further step) A1 cao
	<b>(c)</b> $0.8 \times 0.8 \times 0.8 \times 0.8$	0.4096	<b>2</b>	M1 $0.8 \times 0.8 \times 0.8 \times 0.8$ or $0.8^4$ A1 cao
<b>10</b>	<b>(a)</b> $18 \times (63/81) =$	14	<b>2</b>	M1 $63/81$ or $81/63$ or 1.2857.. or 0.7777.. A1 cao
	<b>(b)</b> Cosine Rule: $70^2 = 18^2 + 81^2 - 2 \times 18 \times 81 \times \cos A$	$47.1^\circ$	<b>3</b>	M1 $70^2 = 18^2 + 81^2 - 2 \times 18 \times 81 \times \cos A$ M1 either $\cos A = \frac{18^2 + 81^2 - 70^2}{2 \times 18 \times 81}$ or $70^2 = 6885 - 2916 \cos A$ A1 cao
<b>11</b>	D, C, E, F, A, B	DCEFAB	<b>3</b>	B3 cao (B2 for 4 correct B1 for 2 correct)
<b>12</b>	$5x - 3x \leq 14 - 7$ $2x \leq 7$	$x \leq 3.5$	<b>2</b>	M1 for $5x - 3x \leq 14 - 7$ o.e. A1 for $x \leq 3.5$ o.e.
<b>13</b>	$18.85 \div 3.6$	5.23611111	<b>2</b>	B1 for 18.85 as numerator or 3.6 as denominator B1 5.23611 or better
<b>14</b>		$n = 3$	<b>2</b>	B1 for $n$ cao
		$p = 37$ 111	<b>1</b>	B1 for $p$ cao B1 cao

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<b>15</b>	$(2 + \sqrt{5})(2 + \sqrt{5}) = 4 + 2\sqrt{5} + 2\sqrt{5} + 5$	$9 + 4\sqrt{5}$	<b>2</b>	M1 for $4 + 2\sqrt{5} + 2\sqrt{5} + 5$ or better A1 cao (accept $a = 9, b = 4$ )
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<b>16</b>	<p><b>(a)</b></p> $\text{Total time} = \frac{D_1}{V_1} + \frac{D_2}{V_2} = \frac{20}{x} + \frac{20}{x-2}$ <p>So <math>\frac{20}{x} + \frac{20}{x-2} = 4</math></p>		<b>2</b>	<p>M1 any two of <math>\frac{20}{x}, \frac{20}{x-2}, =4</math></p> <p>A1 cao</p>	
	<p><b>(b)</b></p> $20(x-2) + 20x = 4x(x-2)$ $20x - 40 + 20x = 4x^2 - 8x$ $4x^2 - 48x + 40 = 0$ $x^2 - 12x + 10 = 0$		<b>2</b>	<p>M1 Correct removal of denominators</p> <p>A1 Convincing algebra throughout</p> <p>.</p>	
	<p><b>(c)</b></p> $\frac{-(-12) \pm \sqrt{(12^2 - 4 \cdot 1 \cdot 10)}}{2}$ $\frac{12 \pm \sqrt{104}}{2}$		11.1, 0.9	<b>3</b>	<p>M1 correct substitution</p> <p>A2 11.1 and 0.9</p> <p>(A1 one answer)</p>
	<p><b>(d)</b></p> <p><math>x = 11.099</math> or <math>0.90098</math></p>		<b>1</b>	<p>B1: Substitution of 0.9 into the speed for the return home (<math>x - 2</math>) would give a negative value</p>	
<b>17</b>	<p>Height s.f. = <math>20 \div 12 = \frac{5}{3}</math></p> <p>Vol s.f. = <math>(\frac{5}{3})^3</math></p> <p><math>V = 162 \times (\frac{5}{3})^3</math></p>	750	<b>3</b>	<p>B1 for volume s.f.</p> <p>M1 for vol s.f. <math>\times 162</math></p> <p>A1 cao</p>	