

Higher Grade - Paper 1 2007/2008

ANSWERS - Section A

- 1 D
- 2 B
- 3 C
- 4 C
- 5 B
- 6 D
- 7 A
- 8 C
- 9 D
- 10 B
- 11 B
- 12 C
- 13 D
- 14 A
- 15 D
- 16 C
- 17 C
- 18 D
- 19 B
- 20 A

	A	B	C	D
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2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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17	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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	Give 1 mark for each •	Illustration(s) for awarding each mark
21(a)	<b>ans: proof (3 marks)</b>	
	<ul style="list-style-type: none"> <li>•<sup>1</sup> finds expressions for 2 areas</li> <li>•<sup>2</sup> adds 4 to area of triangle and equates</li> <li>•<sup>3</sup> reorganises to standard form before proof</li> </ul>	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>A_{rect} = x(2k - 2); A_{tri} = x(x + k)</math></li> <li>•<sup>2</sup> <math>x(x + k) + 4 = x(2k - 2)</math></li> <li>•<sup>3</sup> <math>x^2 + 2x - kx + 4 = 0</math></li> </ul>
	<b>(b) ans: <math>k = 6</math> (3 marks)</b>	
	<ul style="list-style-type: none"> <li>•<sup>1</sup> knows condition for equal roots</li> <li>•<sup>2</sup> re-arranges to quadratic ready to solve</li> <li>•<sup>3</sup> solves and discards</li> </ul>	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>b^2 - 4ac = 0</math> [stated or implied]</li> <li>•<sup>2</sup> <math>k^2 - 4k - 12 = 0</math></li> <li>•<sup>3</sup> <math>(k + 2)(k - 6) = 0; k = -2</math> or <math>6; k = 6</math></li> </ul>
(c)	<b>ans: <math>x = 2; 20\text{cm}^2; 16\text{cm}^2</math> (3 marks)</b>	
	<ul style="list-style-type: none"> <li>•<sup>1</sup> substitutes value of <math>k</math> to form quadratic</li> <li>•<sup>2</sup> solves to <math>x</math></li> <li>•<sup>3</sup> finds areas</li> </ul>	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>x^2 - 4x + 4 = 0</math></li> <li>•<sup>2</sup> <math>(x - 2)^2 = 0; x = 2</math></li> <li>•<sup>3</sup> <math>A_{rect} = 20\text{cm}^2; A_{tri} = 16\text{cm}^2</math></li> </ul>
22(a)	<b>ans: <math>3y + x = -30</math> (2 marks)</b>	
	<ul style="list-style-type: none"> <li>•<sup>1</sup> identifies required gradient</li> <li>•<sup>2</sup> substitutes into general equation</li> </ul>	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>m_{CB} = -\frac{1}{3}</math></li> <li>•<sup>2</sup> <math>y + 11 = -\frac{1}{3}(x - 3)</math> [or equivalent]</li> </ul>
(b)	<b>ans: D(-3,-9) (3 marks)</b>	
	<ul style="list-style-type: none"> <li>•<sup>1</sup> knows to use systems of equations</li> <li>•<sup>2</sup> finds value for <math>x</math></li> <li>•<sup>3</sup> finds value for <math>y</math> and states coordinates</li> </ul>	<ul style="list-style-type: none"> <li>•<sup>1</sup> evidence</li> <li>•<sup>2</sup> <math>x = -3</math></li> <li>•<sup>3</sup> <math>y = -9; (-3,-9)</math></li> </ul>
(c)	<b>ans: C(-9,-7) (1 mark)</b>	
	<ul style="list-style-type: none"> <li>•<sup>1</sup> states coordinates of C</li> </ul>	<ul style="list-style-type: none"> <li>•<sup>1</sup> C(-9,-7)</li> </ul>
(d)	<b>ans: <math>(x + 3)^2 + (y - 1)^2 = 100</math> (4 marks)</b>	
	<ul style="list-style-type: none"> <li>•<sup>1</sup> identifies diameter</li> <li>•<sup>2</sup> finds centre</li> <li>•<sup>3</sup> finds radius or <math>r^2</math></li> <li>•<sup>4</sup> subs into general equation</li> </ul>	<ul style="list-style-type: none"> <li>•<sup>1</sup> AC is diameter [ <math>\angle ADC</math> is right-angled]</li> <li>•<sup>2</sup> midpoint of AC is (-3,1)</li> <li>•<sup>3</sup> <math>r = 10</math> or <math>r^2 = 100</math></li> <li>•<sup>4</sup> <math>(x + 3)^2 + (y - 1)^2 = 100</math></li> </ul>

	Give 1 mark for each •	Illustration(s) for awarding each mark
23(a)	<b>ans: <math>(x - 4)^2 - 15; p = -4, q = -15</math> (4 marks)</b> <ul style="list-style-type: none"> <li>•<sup>1</sup> finds derivative</li> <li>•<sup>2</sup> starts to complete square</li> <li>•<sup>3</sup> completes</li> <li>•<sup>4</sup> states values of <math>p</math> and <math>q</math></li> </ul>	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>f(x) = x^2 - 8x + 1</math></li> <li>•<sup>2</sup> <math>(x - 4)^2 \dots\dots\dots</math></li> <li>•<sup>3</sup> <math>\dots\dots\dots -15</math></li> <li>•<sup>4</sup> <math>p = -4, q = -15</math></li> </ul>
(b)	<b>ans: -15 when <math>x = 4</math> (2 marks)</b> <ul style="list-style-type: none"> <li>•<sup>1</sup> states minimum rate of change</li> <li>•<sup>2</sup> states value of <math>x</math></li> </ul>	<ul style="list-style-type: none"> <li>•<sup>1</sup> rate of change is -15</li> <li>•<sup>2</sup> <math>x = 4</math></li> </ul>
24	<b>ans: <math>\frac{2\pi}{3}, 0</math> (5 marks)</b> <ul style="list-style-type: none"> <li>•<sup>1</sup> recognises and replaces trig identity</li> <li>•<sup>2</sup> re-arranges to quadratic and equates to 0</li> <li>•<sup>3</sup> factorises quadratic</li> <li>•<sup>4</sup> finds values for <math>a</math></li> <li>•<sup>5</sup> discards &amp; communicates correct solutions</li> </ul>	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>2(1 - \cos^2 a) = \cos a + 1</math></li> <li>•<sup>2</sup> <math>1 - \cos a - 2 \cos^2 a = 0</math></li> <li>•<sup>3</sup> <math>(1 - 2 \cos a)(1 + \cos a) = 0</math></li> <li>•<sup>4</sup> <math>\frac{\pi}{3}, \pi, \frac{5\pi}{3}</math></li> <li>•<sup>5</sup> <math>\frac{\pi}{3}, \pi,</math></li> </ul> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-left: auto; margin-right: auto;"> <p style="text-align: center;">Total: 30 marks</p> </div>