

**Edexcel GCE**  
**Core Mathematics C1**  
**Practice Paper A4**  
**(Mark scheme)**

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**Mr.S.V.Swarnaraja (Marking Examiner, Team Leader & Author)**  
**[www.swanash.com](http://www.swanash.com), Mobile: +94777304755 , email: [swa@swanash.com](mailto:swa@swanash.com)**

Question number	Scheme	Marks
<b>1.</b> (a)  (b)	$3x - x > 13 + 8$ $x > \frac{21}{2}$ $x^2 - 5x - 14 > 0$ $(x - 7)(x + 2) > 0$ $x = 7, -2$ $x < -2$ or $x > 7$	M1, A1     (2)  B1 M1, A1 ft     (3)  <b>(5 marks)</b>
<b>2.</b> (a)  (b)	$x = -\frac{1}{2}$ $4 = 2^2$ and $\sqrt{2} = 2^{\frac{1}{2}}$ , $y = 2\frac{1}{2}$ $y - x = 3$ $2^3 = 8$ (or: $4\sqrt{2} \div \frac{1}{\sqrt{2}} = 8$ )	B1  M1, A1     (3)  M1 A1     (2)  <b>(5 marks)</b>
<b>3.</b> (a)  (b)	$(x + k)^2, -k^2 + c (= 0)$ $(x + k)^2 = k^2 - c$ $x = -k \pm \sqrt{(k^2 - c)}$ * (Discriminant = 0, $k^2 = 81$ $k = 9$ , or $-9$ )	M1, A1 M1 A1 c.s.o     (4)  B1, B1     (2)  <b>(6 marks)</b>
<b>4.</b> (a)(i)  (ii)  (b)	$a + (n - 1)d = 280 + (35 \times 5) = 455$ $\frac{1}{2}n [2a + (n - 1)d] = 18 [560 + (35 \times 5)] = 13\,230$ $18 [560 + (35 \times d)] = 17\,000$ $d = 10.98\dots$ $x = 11$ (allow 11.0 or 10.98 or 10.99 or $10\frac{62}{63}$ )	M1 A1  M1 A1 ft     (4)  M1 A1  M1 A1     (4)  <b>(8 marks)</b>

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<b>5.</b> (a) (b) (c)	<p>(2, 0) (or <math>x = 2, y = 0</math>)</p> <p> <math>y^2 = 4\left(\frac{3y+12}{2} - 2\right)</math> or <math>\left(\frac{2x-12}{3}\right)^2 = 4(x-2)</math>  <math>y^2 - 6y - 16 = 0</math> or <math>x^2 - 21x + 54 = 0</math> (or equiv. 3 terms)  <math>(y+2)(y-8) = 0, y = \dots</math> or <math>(x-3)(x-18) = 0, x = \dots</math> (3 term quad.)  <math>y = -2, y = 8</math> or <math>x = 3, x = 18</math>  <math>x = 3, x = 18</math> or <math>y = -2, y = 8</math> (attempt <u>one</u> for M mark)            (A1ft requires both values)         </p> <p>           Grad. of <math>AQ = \frac{8-0}{18-2}</math>, Grad. of <math>AP = \frac{0-(-2)}{2-3}</math> (attempt <u>one</u> for M mark)         </p> <p> <math>m_1 \times m_2 = \frac{1}{2} \times -2 = -1</math>, so <math>\angle PAQ</math> is a right angle (A1 is c.s.o.)         </p> <p> <u>Alternative:</u> Pythagoras: Find 2 lengths [M1]  <math>AQ = \sqrt{320}, AP = \sqrt{5}, PQ = \sqrt{325}</math> (O.K. unsimplified) [A1ft]            (if decimal values only are given, with no working shown, require at least 1 d.p. accuracy for M1(implied) A1)  <math>AQ^2 + AP^2 = PQ^2</math>, so <math>\angle PAQ</math> is a right angle [M1, A1]            M1 requires attempt to use Pythag. for right angle at A, and            A1 requires correct <u>exact</u> working + conclusion.         </p>	<p>B1 (1)</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>M1 A1ft (6)</p> <p>M1 A1ft</p> <p>M1 A1 (4)</p> <p>(11 marks)</p>
<b>6.</b> (a) (b) (c) (d)	<p> <math>AB: m = -\frac{4}{3}, BC: m = \frac{3}{4}</math> (s.c. <math>AB: \frac{4}{3}, BC: \frac{3}{4}</math> B1)         </p> <p> <math>BC = \sqrt{(8^2 + (k-4)^2)}</math> (<math>= \sqrt{(k^2 - 8k + 80)}</math>)         </p> <p> <math>(k^2 - 8k + 80) = 100</math> (Their <math>BC^2 = 100</math>)  <math>k^2 - 8k - 20 = 0</math> (<math>(k-10)(k+2) = 0</math>)  <math>k = 10, k = -2</math> (rejected)         </p> <p>(11, 6)</p>	<p>B1, M1 A1 ft (3)</p> <p>M1 A1 (2)</p> <p>M1</p> <p>M1 A1</p> <p>A1 (4)</p> <p>B1 B1 (2)</p> <p>(11 marks)</p>

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7.	<p>(a) Integrate: <math>y = x^3 - 10x^2 + 29x (+C)</math>  <math>6 = 8 - 40 + 58 + C \Rightarrow C = -20</math>      (<math>y = x^3 - 10x^2 + 29x - 20</math>)</p> <p>(b) Substitute <math>x = 4</math>: <math>64 - 160 + 116 - 20 = 0</math></p> <p>(c) At <math>x = 2</math>, <math>\frac{dy}{dx} = 12 - 40 + 29 = 1</math>  Tangent: <math>y - 6 = x - 2</math>      (<math>y = x + 4</math>)</p> <p>(d) <math>\frac{dy}{dx} = 1</math>  <math>3x^2 - 20x + 28 = 0</math>  <math>(3x - 14)(x - 2) = 0</math>  <math>x = \frac{14}{3}</math></p>	<p>M1 A1</p> <p>M1 A1      (4)</p> <p>M1 A1      (2)</p> <p>B1</p> <p>M1 A1      (3)</p> <p>M1</p> <p>M1</p> <p>M1 A1</p> <p>A1      (5)</p> <p><b>(14 marks)</b></p>