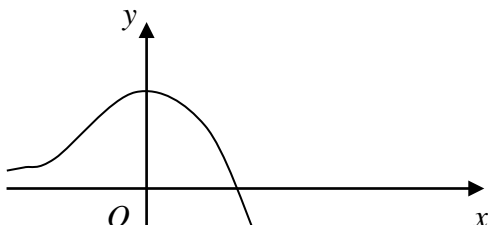
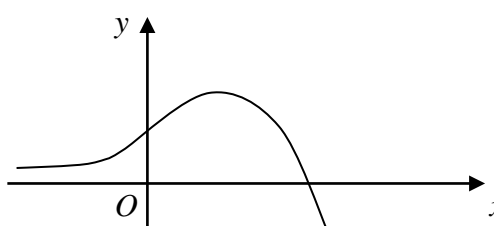
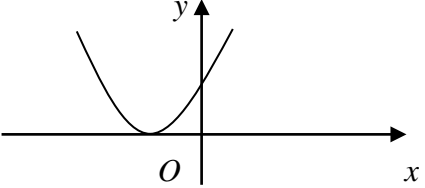


Question number	Scheme	Marks
1.	$a = 7, d = 2$ $S_{20} = \frac{1}{2} \times 20 \times (2 \times 7 + 19 \times 2) = 520$	B1 M1 A1 <b>(3 marks)</b>
2.	$\int (5x + 3\sqrt{x}) dx = \frac{5x^2}{2} + 2x^{\frac{3}{2}} + C$	M1 A1 A1 B1 <b>(4 marks)</b>
3. (a) (b)	$\sqrt{80} = 4\sqrt{5}$ $(4 - \sqrt{5})^2 = 16 - 8\sqrt{5} + 5 = 21 - 8\sqrt{5}$	B1 (1) M1 A1 A1 (3) <b>(4 marks)</b>
4.	Gradient of $AB = \frac{4 - (-6)}{3 - 7} \left( = -\frac{5}{2} \right)$ Gradient of $l = \frac{2}{5}$ $y - 4 = \frac{2}{5}(x - 3) \qquad 2x - 5y + 14 = 0$	M1 A1 M1 M1 A1 (5) <b>(5 marks)</b>
5. (a) (b)	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>Position, Shape</p> <p>(0, 2), (2, 0)</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>Position, Shape</p> <p>(0, 1), <math>\left(\frac{1}{2}, 2\right)</math>, <math>\left(\frac{3}{2}, 0\right)</math></p> </div> </div>	B1 B1 B1 (3) B1 B2 (1, 0) (3) <b>(6 marks)</b>

Question number	Scheme	Marks
6.	<p>(a) <math>5 - 2x = 2x^2 - 3x - 16</math>      <math>2x^2 - x - 21 = 0</math></p> <p><math>(2x - 7)(x + 3) = 0</math>      <math>x = -3, x = \frac{7}{2}</math></p> <p><math>y = 11, y = -2</math></p> <p>(b) Using critical values <math>x = -3,</math>      <math>x = \frac{7}{2}</math></p> <p><math>x &lt; -3,</math>      <math>x &gt; \frac{7}{2}</math></p>	<p>M1 A1</p> <p>M1 A1</p> <p>M1 A1ft (6)</p> <p>M1</p> <p>M1 A1ft (3)</p> <p><b>(9 marks)</b></p>
7.	<p>(a) <math>a + (n - 1)d = 250 + (10 \times 50) = \text{£}750</math></p> <p>(b) <math>\frac{1}{2}n [2a + (n - 1)d] = \frac{1}{2} \times 20 \times (500 + 19 \times 50), = \text{£}14500</math></p> <p>(c) <math>B: \frac{1}{2} \times 20 \times (2A + 19 \times 60) [= 10(2A + 1140)], = \text{“}14500\text{”}</math></p> <p>Solve for A: <math>A = 155</math></p>	<p>M1 A1 (2)</p> <p>M1 A1, A1 (3)</p> <p>B1, M1</p> <p>M1 A1 (4)</p> <p><b>(9 marks)</b></p>
8.	<p>(a) <math>a = 5,</math>      <math>(x + 5)^2 - 25 + 36</math>      <math>b = 11</math></p> <p>(b) <math>b^2 - 4ac = 100 - 144,</math>      <math>&lt; 0,</math> therefore no real roots</p> <p>(c) Equal roots if <math>b^2 - 4ac = 0</math>      <math>4k = 100</math>      <math>k = 25</math></p> <p>(d)</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>Shape, position</p> <p><math>(-5, 0) (0, 25)</math></p> </div> </div>	<p>B1, M1 A1 (3)</p> <p>M1 A1 (2)</p> <p>M1 A1 (2)</p> <p>B1 B1</p> <p>B1 B1ft (4)</p> <p><b>(11 marks)</b></p>

Question number	Scheme	Marks
<b>9.</b> (a)  (b)  (c)	$f(x) = x^3 - 4x^2 + 6x + C$ $5 = 27 - 36 + 18 + C \quad C = -4$ $x = 2: \quad y = 8 - 16 + 12 - 4 = 0$ $f'(3) = 27 - 24 + 6 = 9, \quad \text{Parallel therefore equal gradient}$ $3x^2 - 8x + 6 = 9 \quad 3x^2 - 8x - 3 = 0$ $(3x + 1)(x - 3) = 0 \quad Q: x = -\frac{1}{3}$	M1 A1 M1 A1 (4) M1 A1 (2) B1, M1 M1 M1 A1 (5) <b>(11 marks)</b>
<b>10.</b> (a)  (b)  (c)	$\frac{dy}{dx} = 3x^2 - 5 - 2x^{-2}$ At both A and B, $\frac{dy}{dx} = 3 \times 1 - 5 - \frac{2}{1} \quad (= -4)$ Gradient of normal $= \frac{1}{4}$ $y - (-2) = \frac{1}{4}(x - 1) \quad 4y = x - 9$ Normal at A meets y-axis where $x = 0: \quad y = -\frac{9}{4}$ Similarly for normal at B: $4y = x + 9 \quad y = \frac{9}{4}$ Length of $PQ = \frac{9}{4} + \frac{9}{4} = \frac{9}{2}$	M1 A2(1,0) M1 A1 (5) M1 A1ft M1 A1 (4) B1 M1 A1 A1 (4) <b>(13 marks)</b>