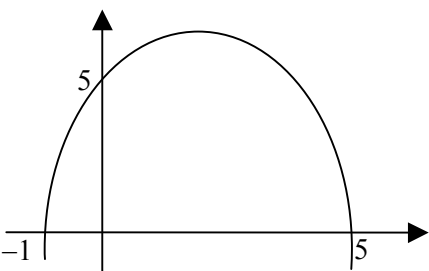


EDEXCEL PURE MATHEMATICS P1 (6671) – NOVEMBER 2002 PROVISIONAL MARK SCHEME

Question Number	Scheme	Marks
1.	<p>(a) $3x - x > 13 + 8$ $x > \frac{21}{2}$</p> <p>(b) $x^2 - 5x - 14 > 0$ $(x - 7)(x + 2) > 0$ $x = 7, -2$ $x < -2$ or $x > 7$</p>	<p>M1, A1 (2)</p> <p>B1 M1, A1 ft (3)</p> <p>(5 marks)</p>
2.	<p>(a) $f(-3) = -27 - 27 + 30 + 24 = 0 \Rightarrow (x + 3)$ is factor</p> <p>(b) $(x + 3)(x^2 - 6x + 8)$ $(x + 3)(x - 2)(x - 4)$</p>	<p>M1 A1 (2)</p> <p>M1 A1 M1 A1 (4)</p> <p>(6 marks)</p>
3.	<p>(i) Divide: $1 + 2x^{-1}$ Differentiate: $6x^2 + \frac{1}{2}x^{-\frac{1}{2}} - 2x^{-2}$</p> <p>(ii) $\frac{x^2}{4} + \frac{x^{-1}}{-1}$ $[]^4 - []_1 = \left(4 - \frac{1}{4}\right) - \left(\frac{1}{4} - 1\right) = 4\frac{1}{2}$</p>	<p>M1 A1 M1 A2 (1,0) (5)</p> <p>M1 A1A1 M1 A1 (5)</p> <p>(10 marks)</p>
4.	<p>(a) $S = a + (a + d) + (a + 2d) + \dots + [a + (n - 1)d]$ $S = [a + (n - 1)d] + [a + (n - 2)d] + \dots + a$ Add: $2S = n[2a + (n - 1)d] \Rightarrow S = \frac{1}{2}n[2a + (n - 1)d]$</p> <p>(b) $a = 54000$ and $n = 9$ $619200 = \frac{1}{2} \times 9 \times (2 \times 54000 + 8d)$ $d = 3700$</p> <p>(c) $a + (n - 1)d = a + 10d = 54000 + 10d = \pounds 91000$</p> <p>(d) $ar^{n-1} = 54000 \times 1.06^{10}$ (ft their n) $= \pounds 96700$ (or $\pounds 97000$)</p>	<p>B1 M1 M1 A1 (4)</p> <p>B1 (2) M1 A1ft A1</p> <p>M1 A1 M1 A1ft A1 (3)</p> <p>(13 marks)</p>

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Question Number	Scheme	Marks
<p>5. (i)</p> <p>(ii) (a)</p> <p>(b)</p>	<p>$\arcsin 0.6 = 36.9^\circ$ (awrt)</p> <p>$2x + 50 = 36.87, \quad 2x = -13.13^\circ + 360^\circ = 346.87^\circ$</p> <p>$2x + 50 + 180 - 36.87, \quad 2x = 143.13^\circ - 50^\circ = 93.13^\circ$</p> <p>$x = 46.6, \quad 173.4$</p> <p>$\sin 60^\circ = \frac{\sqrt{3}}{2}, \quad \frac{BC}{\left(\frac{1}{3}\right)} = \frac{18}{\sin 60^\circ}$</p> <p>$BC = 6 \div \frac{\sqrt{3}}{2} \quad BC = \frac{12}{\sqrt{3}} = 4\sqrt{3}$ (*)</p> <p>$\cos^2 \theta = 1 - \sin^2 \theta = 1 - \frac{1}{9}$</p> <p>$\sin \theta = \sqrt{\frac{8}{9}} \quad \left(= \frac{\sqrt{8}}{3} = \frac{2\sqrt{2}}{3} \right)$</p>	<p>α</p> <p>B1</p> <p>M1 M1</p> <p>M1</p> <p>M1 A1 A1 (7)</p> <p>B1, M1</p> <p>M1 A1 (4)</p> <p>M1</p> <p>A1 (2)</p> <p>(13 marks)</p>
<p>6. (a)</p> <p>(b)</p>  <p>(c)</p> <p>(d)</p> <p>(e)</p>	<p>9</p> <p>Shape</p> <p>Position of max.</p> <p>5 on y-axis</p> <p>-1 and 5 on x-axis</p> <p>Gradient: $\frac{8 - (-7)}{3 - (-2)}$</p> <p>$y - 8 = \text{“gradient”} (x - 3) \quad y = 3x - 1$</p> <p>Where $y = 0, \quad x = \frac{1}{3}$</p> <p>Mid point: $\left(\frac{-7+8}{2}, \frac{-2+3}{2} \right) = \left(\frac{1}{2}, \frac{1}{2} \right) \quad k = 1$</p>	<p>B1 (1)</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>M1 A1 (5)</p> <p>M1 A1</p> <p>M1 A1 (4)</p> <p>M1 A1ft (2)</p> <p>M1 A1 (2)</p> <p>(14 marks)</p>

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