

Question Number	Scheme	Marks
10		
(a)	$\alpha + \beta = \frac{5}{2} \quad \alpha\beta = \frac{1}{2}$ $\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta = \left(\frac{5}{2}\right)^2 - 2 \times \frac{1}{2} = \frac{21}{4}$	B1 M1A1 (3)
(b)	$\alpha^4 + \beta^4 = (\alpha^2 + \beta^2)^2 - 2\alpha^2\beta^2 = \left(\frac{21}{4}\right)^2 - 2 \times \left(\frac{1}{2}\right)^2$ $= \frac{433}{16} \quad *$	M1 A1 (2)
(c)	$\left(\alpha^2 + \frac{1}{\alpha^2}\right) + \left(\beta^2 + \frac{1}{\beta^2}\right) = \alpha^2 + \beta^2 + \frac{1}{\alpha^2} + \frac{1}{\beta^2}$ $= \alpha^2 + \beta^2 + \frac{\beta^2 + \alpha^2}{\alpha^2\beta^2}, = \frac{21}{4} + \frac{\frac{21}{4}}{\left(\frac{1}{2}\right)^2} = \frac{105}{4}$ $\left(\alpha^2 + \frac{1}{\alpha^2}\right)\left(\beta^2 + \frac{1}{\beta^2}\right) = \alpha^2\beta^2 + \frac{\beta^2}{\alpha^2} + \frac{\alpha^2}{\beta^2} + \frac{1}{\alpha^2\beta^2}$ $\alpha^2\beta^2 + \frac{\beta^4 + \alpha^4}{\alpha^2\beta^2} + \frac{1}{\alpha^2\beta^2} = \left(\frac{1}{2}\right)^2 + \frac{433}{16} \times \left(\frac{2}{1}\right)^2 + \left(\frac{2}{1}\right)^2 = \frac{225}{2} \quad \text{oe}$ $x^2 - \text{sum} \times x + \text{product} (=0) \quad x^2 - \frac{105}{4}x + \frac{225}{2} (=0)$ $4x^2 - 105x + 450 = 0$	M1,A1 M1 M1A1 M1 A1 (7) [12]

Question Number	Scheme	Marks
11		
(a)	$r = 2$	B1 (1)
(b)	$(x-1)(x-3)(x+2) = x^3 + px^2 + qx + 6$ $(x-4x+3)(x+2) = x^3 - 2x^2 - 5x + 6$ $p = -2, \quad q = -5$	M1 A1A1 (3)
(c)	$y = x^3 - 2x^2 - 5x + 6$ $\frac{dy}{dx} = 3x^2 - 4x - 5$ $x = 2 \quad \frac{dy}{dx} = 12 - 8 - 5 = -1$ y-coord of B is $8 - 8 - 10 + 6 = -4$ Equation tangent: $y + 4 = -1(x - 2) \quad (y = -x - 2)$	M1 A1ft B1ft M1A1 (5)
(d)	A is $(-2, 0)$ $0 + 4 = -1(-2 - 2) \quad \therefore$ passes through A	B1ft B1ft (2)
(e)	area $= \int_{-2}^2 \left\{ (x^3 - 2x^2 - 5x + 6) - (-x - 2) \right\} dx$ $\int_{-2}^2 (x^3 - 2x^2 - 4x + 8) dx$ $= \left[\frac{1}{4}x^4 - \frac{2}{3}x^3 - 2x^2 + 8x \right]_{-2}^2$ $= 4 - \frac{16}{3} - 8 + 16 - \left(4 + \frac{16}{3} - 8 - 16 \right)$ $= 21\frac{1}{3} \quad (\text{accept awrt } 21.3)$	M1 M1A1ft M1dep A1 (5)

[16]

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467

Fax 01623 450481

Email publication.orders@edexcel.com

Order Code UG034504 January 2013

For more information on Edexcel qualifications, please visit our website
www.edexcel.com

Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE



Llywodraeth Cynulliad Cymru
Welsh Assembly Government

