


Q1 (EDEXCEL C2 JAN 2006 Q2)

2.	<p>(a) <math>(1+px)^9 = 1+9px ; +\binom{9}{2}(px)^2</math></p> <p>(b) <math>9p = 36, \text{ so } \underline{p=4}</math></p> <p><math>q = \frac{9 \times 8}{2} p^2 \text{ or } 36p^2 \text{ or } 36p \text{ if that follows from their (a)}</math></p> <p>So <math>\underline{q = 576}</math></p>	<p>B1 B1 (2)</p> <p>M1 A1</p> <p>M1</p> <p>A1cao (4)</p> <p><b>6</b></p>
N.B.	<p>(a) 2<sup>nd</sup> B1 for <math>\binom{9}{2}(px)^2</math> or better. Condone “,” not “+”.</p> <p>(b) 1<sup>st</sup> M1 for a linear equation for <math>p</math>.</p> <p>2<sup>nd</sup> M1 for either printed expression, follow through their <math>p</math>.</p> <p><math>1+9px+36px^2</math> leading to <math>p = 4, q = 144</math> scores B1B0 M1A1M1A0 i.e 4/6</p>	

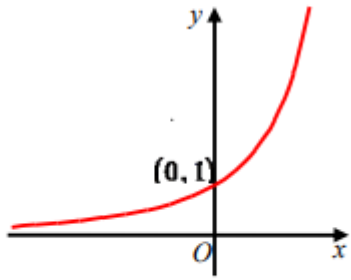
Q2 (EDEXCEL C2 JUN 2006 Q4)

4.	<p>(a) <math>f(-2) = 2(-2)^3 + 3(-2)^2 - 29(-2) - 60</math> M: Attempt <math>f(2)</math> or <math>f(-2)</math></p> <p><math>= -16 + 12 + 58 - 60 = -6</math></p> <p>(b) <math>f(-3) = 2(-3)^3 + 3(-3)^2 - 29(-3) - 60</math> M: Attempt <math>f(3)</math> or <math>f(-3)</math></p> <p><math>(= -54 + 27 + 87 - 60) = 0 \therefore (x+3)</math> is a factor</p> <p>(c) <math>(x+3)(2x^2 - 3x - 20)</math></p> <p><math>= (x+3)(2x+5)(x-4)</math></p>	<p>M1</p> <p>A1 (2)</p> <p>M1</p> <p>A1 (2)</p> <p>M1 A1</p> <p>M1 A1 (4)</p> <p><b>8</b></p>
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Q3 (EDEXCEL C1 June 2005 Q6)

6. (a)	$6x + 3 > 5 - 2x \Rightarrow 8x > 2$ $x > \frac{1}{4}$ or 0.25 or $\frac{2}{8}$	M1 A1  (2)
(b)	$(2x - 1)(x - 3) (> 0)$ Critical values $x = \frac{1}{2}, 3$	M1 (both) A1
	 <p>Choosing "outside" region</p> $x > 3$ or $x < \frac{1}{2}$	M1 A1 f.t.  (4)
(c)	$x > 3$ or $\frac{1}{4} < x < \frac{1}{2}$	B1f.t. B1f.t. (2)  (8)

Q4 (EDEXCEL C2 JUN 2014 Q8)

8.	Graph of $y = 3^x$ and solving $3^{2x} - 9(3^x) + 18 = 0$	
(a)		At least two of the three criteria correct. (See notes below.) B1 <hr/> All three criteria correct. (See notes below.) B1 <hr/> <b>Criteria number 1:</b> Correct shape of curve for $x \geq 0$ and at least touches the positive y-axis. <b>Criteria number 2:</b> Correct shape of curve for $x < 0$ . Must not touch the x-axis or have any turning points. <b>Criteria number 3:</b> (0, 1) stated or in a table or 1 marked on the y-axis. Allow (1, 0) rather than (0, 1) if marked in the "correct" place on the y-axis.
		<b>[2]</b>

(b)	$(3^x)^2 - 9(3^x) + 18 = 0$ or $y = 3^x \Rightarrow y^2 - 9y + 18 = 0$	Forms a quadratic of the correct form in $3^x$ or in "y" where "y" = $3^x$ or even in x where "x" = $3^x$	M1
	$\{(y-6)(y-3) = 0 \text{ or } (3^x-6)(3^x-3) = 0\}$		
	$y = 6, y = 3 \text{ or } 3^x = 6, 3^x = 3$	Both $y = 6$ and $y = 3$ .	A1
	$\{3^x = 6 \Rightarrow\} x \log 3 = \log 6$ or $x = \frac{\log 6}{\log 3}$ or $x = \log_3 6$	A valid method for solving $3^x = k$ where $k > 0, k \neq 1, k \neq 3$  to give either $x \log 3 = \log k$ or $x = \frac{\log k}{\log 3}$ or $x = \log_3 k$	dM1
	$x = 1.63092\dots$	awrt 1.63	A1 cso
	Provided the first M1A1 is scored, the second M1A1 can be implied by awrt 1.63		
	$x = 1$	$x = 1$ stated as a solution from <i>any</i> working.	B1
		[5]	
		<b>Total 7</b>	

Q5 (EDEXCEL C1 JUNE 2009 Q10)

(a)  $x(x^2 - 6x + 9)$  B1  
 $= x(x - 3)(x - 3)$  M1 A1 3

**Note**

B1 for correctly taking out a factor of  $x$

M1 for an attempt to factorize their 3TQ e.g.  $(x + p)(x + q)$   
 where  $|pq| = 9$ .

So  $(x - 3)(x + 3)$  will score M1 but A0

A1 for a fully correct factorized expression – accept  $x(x - 3)^2$   
 If they “solve” use ISW

S.C.

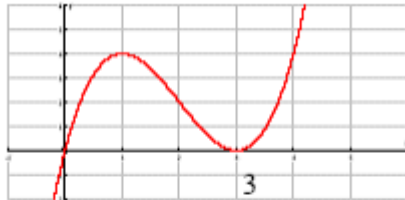
If the only correct linear factor is  $(x - 3)$ , perhaps from factor theorem, award B0M1A0

Do not award marks for factorising in part (b)

**For the graphs**

“Sharp points” will lose the 1<sup>st</sup> B1 in (b) but otherwise be generous on shape Condone  $(0, 3)$  in (b) and  $(0, 2), (0, 5)$  in (c) if the points are marked in the correct places.

(b)



Shape

Through origin (not touching) B1

Touching  $x$ -axis only once B1

Touching at  $(3, 0)$ , or 3 on  $x$ -axis B1ft 4

[Must be on graph not in a table]

**Note**

2<sup>nd</sup> B1 for a curve that starts or terminates at  $(0, 0)$  score B0

4<sup>th</sup> B1ft for a curve that touches (not crossing or terminating) at  $(a, 0)$

where their  $y = x(x - a)^2$