

Question Number	Scheme	Marks
<b>6a</b>	$4(p-2x) = \frac{12+15p}{x+p}$ $8x^2 + 4px + 12 + 15p - 4p^2 = 0$ <p>e.g. <math>a=8, b=4p, c=12+15p-4p^2</math></p> $(4p)^2 - 4 \times 8 \times (12+15p-4p^2) > 0$ $3p^2 - 10p - 8 > 0 \quad *$	M1 dM1 A1*
	(3)	
<b>b</b>	e.g. $(p-4)(3p+2) = 0 \Rightarrow 4, -\frac{2}{3}$	M1
	$p < -\frac{2}{3}$ or $p > 4$	M1A1
		(3)
		<b>(6 marks)</b>

Question	Scheme	Marks
<b>10(a)(i)</b>	Equation is $y = \frac{1}{2}(x+2)$	B1
		(1)
<b>(ii)</b>	$l_1$ intersect parabola $\Rightarrow -\frac{1}{4}(x+2)(x-b) = \frac{1}{2}(x+2) \Rightarrow x = \dots$	M1
	$x = b-2$	A1
	$y = \frac{1}{2}b$	A1
		(3)
<b>(b)</b>	$l_2$ passes through $(b, 0)$ and has gradient $-2 \Rightarrow y = \dots$	M1
	$y-0 = -2(x-b)$	A1
		(2)
<b>(c)</b>	So equation is $y - \frac{1}{2}b = -2(x - \frac{1}{2}b)$	M1
	$y - \frac{1}{2}b = -2x + 2b - 4 \Rightarrow y = -2x + \frac{5}{2}b - 4 \quad *$	A1*
		(2)
<b>(d)</b>	$y = -2x + 2b = -2x + \frac{5}{2}b - 4 \Rightarrow 2b = \frac{5}{2}b - 4 \Rightarrow b = \dots$	M1
	or	
	$y = -2x + \frac{5}{2}b - 4, x = b, y = 0 \Rightarrow 0 = -2b + \frac{5}{2}b - 4 \Rightarrow b = \dots$	
	or	
	$-\frac{1}{4}(x+2)(x-b) = -2(x-b) \Rightarrow x = \dots(6) \Rightarrow b-2 = 6 \Rightarrow b = \dots$	A1
	$b = 8$	
		(2)
		<b>(10 marks)</b>

Question	Scheme	Marks
8(a)		B1B1B1
		(3)
(b)	$x(4-x^2) = \frac{A}{x} \Rightarrow 4x^2 - x^4 = A$ $\Rightarrow x^4 - 4x^2 + A = 0^*$	B1*
		(1)
(c)	$A > 0$	B1
	$b^2 = 4ac \Rightarrow 16 = 4A \Rightarrow A = \dots$	M1
	$0 < A < 4$	A1
		(3)
		<b>Total 7</b>

Question Number	Scheme	Marks
1.	$\int \frac{2}{3}x^3 - \frac{1}{2x^3} + 5 dx = \frac{2}{3} \times \frac{x^4}{4} - \frac{1}{2} \times \frac{x^{-2}}{-2} + 5x + c$ $= \frac{1}{6}x^4 + \frac{1}{4}x^{-2} + 5x + c$	M1 A1 A1 A1 <b>(4 marks)</b>

Question	Scheme	Marks
2(a)	$AB = 21 \text{ cm}, BC = 13 \text{ cm}, \angle BAC = 25^\circ, \angle ACB = x^\circ$	
	$\frac{\sin x^\circ}{21} = \frac{\sin 25^\circ}{13}$ o.e	M1
	$\sin x^\circ = 0.6827$ (awrt)	A1
		(2)
(b)	$\sin^{-1}(0.6827) = \dots (43.05^\circ)$	M1
	$(AC < AB \text{ so } \angle ABC < \angle ACB \text{ so})$ required angle is $180^\circ - \sin^{-1}(0.6827) = \dots$	M1
	So $x =$ awrt 136.95	A1
		(3)
		<b>(5 marks)</b>
<b>Notes:</b>		
Condone the omission of the $^\circ$ symbol. Mark (a) and (b) as one		

Question	Scheme	Marks
<b>6(a)</b>	$y - 5x = 75, y = 2x^2 + x - 21$ $\Rightarrow 2x^2 + x - 21 = 5x + 75$ $\Rightarrow 2x^2 - 4x - 96 = 0$ or e.g. $x^2 - 2x - 48 = 0$ or $\Rightarrow y = 2\left(\frac{y-75}{5}\right)^2 + \frac{y-75}{5} - 21$ $\Rightarrow 2y^2 - 320y + 10350 = 0$ or e.g. $y^2 - 160y + 5175 = 0$	M1
	$x^2 - 2x - 48 = 0 \Rightarrow (x-8)(x+6) = 0 \Rightarrow x = -6, 8$	dM1
	$x = -6 \Rightarrow y = 45$ or $x = 8 \Rightarrow y = 115$	dM1
	$P(-6, 45)$ and $Q(8, 115)$	A1
		<b>(4)</b>
<b>(b)</b>	e.g. $y \leq 2x^2 + x - 21, y - 5x \leq 75, y \geq 0, x \leq -3.5$  $x \leq a$ where $-3.5 \leq a < 3$ (or $a \leq x \leq b$ where $a \leq -15, -3.5 \leq b \leq 3$ )	M1A1A1
		<b>(3)</b>
		<b>Total 7</b>

Question Number	Scheme	Marks
<b>11a</b>	$2(x \pm \dots)^2$	B1
	$\dots(x \pm 3)^2 \dots$	M1
	$2(x-3)^2 - 4$	A1
		<b>(3)</b>
<b>b</b>	$(3, -4)$	B1ft
		<b>(1)</b>
<b>c</b>	$m = \frac{28 - -4}{-1 - 3} (= -8)$	M1
	$y - 28 = -8(x+1)$	dM1
	$y = -8x + 20$	A1
		<b>(3)</b>
<b>d</b>	$y \leq "-8x + 20"$ and $y \geq 2x^2 - 12x + 14$ (or $y \geq "2(x-3)^2 - 4"$ )	B1ftB1ft
	$y \leq -8x + 20 \quad y \geq 2x^2 - 12x + 14 \quad y \geq 0, x \geq 0$	B1cso
		<b>(3)</b>
		<b>(10 marks)</b>