

Q	Marking Instructions	AO	Marks	Typical Solution
8(a)	Substitutes coordinates of R into $y = x^3 + px^2 + qx - 45$ to form a correct equation in terms of p and q ACF	1.1b	B1	$3 = 2^3 + 2^2p + 2q - 45$ $40 = 4p + 2q$
	Differentiates $y = x^3 + px^2 + qx - 45$ with at least two terms correct	1.1a	M1	$\frac{dy}{dx} = 3x^2 + 2px + q$
	Obtains a fully correct derivative	1.1b	A1	$8 = 3 \times 2^2 + 4p + q$ $-4 = 4p + q$
	Substitutes $x = 2$ and $\frac{dy}{dx} = 8$ into differential equation to give a correct equation ACF	1.1b	A1	$p = -12 \quad q = 44$
	Obtains $p = -12 \quad q = 44$	1.1b	A1	
8(b)	States that gradient of normal is $-\frac{1}{8}$ PI	1.2	B1	Gradient of normal is $-\frac{1}{8}$
	Writes down equation of line through (2, 3) with 'their' gradient of the normal ACF	1.1a	M1	$(y - 3) = -\frac{1}{8}(x - 2)$
	Substitutes $x = 0$ or $y = 0$ into 'their' straight line equation to find at least one intercept M1M1 PI by $x = 26$ or $y = 3\frac{1}{4}$	1.1a	M1	$y = -\frac{1}{8}x + \frac{13}{4}$ Meets x-axis at (26, 0)
	Calculates area of triangle using both 'their' intercepts or Calculates area of triangle by using integration of 'their' line between $x = 0$ and $x =$ 'their' x intercept	1.1a	M1	Meets y-axis at $(0, 3\frac{1}{4})$ Area = $\frac{1}{2} \times 26 \times 3\frac{1}{4} = \frac{169}{4}$
	Obtains correct area as $\frac{169}{4}$ or $42\frac{1}{4}$ or 42.25 CAO	1.1b	A1	
	Total		10	