

Q 7	Marking Instructions	AO	Marks	Typical solution
(a)	Takes out a factor of 2, or obtains $a = 2$ by equating coefficients. Note $2(x^2 - \text{'anything'})$ or $2(x - \text{'anything'})^2$ scores M1	AO1.1a	M1	$2\left(x^2 - \frac{5x}{2}\right) + k$ $2\left(x - \frac{5}{4}\right)^2 + k - \frac{25}{8}$
	Expresses as $\left(x - \frac{5}{4}\right)^2$ or obtains $b = \frac{5}{4}$ by equating coefficients	AO1.1a	M1	
	Obtains correct expression, If using equating coefficients <b>must</b> be put back in given form required	AO1.1b	A1	
(b)	Selects a method using completed square form (recognition that vertex occurs when $x = \text{'their' } b$ ), discriminant (any use of $b^2 - 4ac$ seen) or calculus (finds $y$ coordinate of stationary point).	AO3.1a	M1	<p>Typical solution 1</p> <p>When <math>x = \frac{5}{4}</math> <math>\left(x - \frac{5}{4}\right)^2 = 0</math></p> $\left(k - \frac{25}{8}\right) > 3$ $k > \frac{49}{8}$
	Forms an appropriate correct inequality for their chosen method. (first time inequality sign seen in each typical solution scores A1)	AO1.1b	A1	
	Obtains $k > \frac{49}{8}$ (ACF)(OE)	AO1.1b	A1	
				<p>Typical solution 2</p> $2x^2 - 5x + k = 3$ $2x^2 - 5x + k - 3 = 0$ $5^2 - 4 \times 2 \times (k - 3) < 0$ $k > \frac{49}{8}$ <p>Typical solution 3</p> $\frac{dy}{dx} = 4x - 5$ <p>At stationary point <math>\frac{dy}{dx} = 0</math></p> $4x - 5 = 0$ $x = \frac{5}{4}$ <p>when <math>x = \frac{5}{4}</math> <math>y = k - \frac{25}{8}</math></p> $k - \frac{25}{8} > 3$ $k > \frac{49}{8}$
	<b>Total</b>	<b>6</b>		