Question	Scheme	Marks	AOs
14(a)	$\dfrac{25x^2-30x-9}{2x^{\frac{1}{2}}} = ...x^{\frac{3}{2}} \pm ...x^{\frac{1}{2}} \pm ...x^{-\frac{1}{2}}$	M1	1.1b
	$\dfrac{25}{2}x^{\frac{3}{2}} - 15x^{\frac{1}{2}} - \dfrac{9}{2}x^{-\frac{1}{2}}$	A1	1.1b
	$\displaystyle\int \dfrac{25}{2}x^{\frac{3}{2}} - 15x^{\frac{1}{2}} - \dfrac{9}{2}x^{-\frac{1}{2}}\,\mathrm{d}x = ...x^{\frac{5}{2}} \pm ...x^{\frac{3}{2}} \pm ...x^{\frac{1}{2}} \quad (+c)$	M1	1.1b
	$5x^{\frac{5}{2}} - 10x^{\frac{3}{2}} - 9x^{\frac{1}{2}} + c$	A1	1.1b
		(4)	
(b)(i)	$5k^{\frac{5}{2}} - 10k^{\frac{3}{2}} - 9k^{\frac{1}{2}} - (-14) < 6\sqrt{k} + 14$	M1	1.1b
	$5k^{\frac{5}{2}} - 10k^{\frac{3}{2}} - 15k^{\frac{1}{2}} < 0 \Rightarrow k^{\frac{1}{2}}(.....) < 0$	dM1	2.1
	$k^2 - 2k - 3 < 0$ *	A1*	1.1b
(ii)	Critical values $-1,\ 3 \Rightarrow k < 3$	M1	1.1b
	$2 < k < 3$	A1	3.2a
		(5)	
			(9 marks)

Notes

(a)

M1: Expands the bracket and attempts to split the fraction up into separate terms and achieves at least one correct index on one term from correct work

A1: Two correct of $\dfrac{25}{2}x^{\frac{3}{2}}$, $-15x^{\frac{1}{2}}$, $-\dfrac{9}{2}x^{-\frac{1}{2}}$ which may be simplified or unsimplified

M1: Increases the power of x by one on at least one term (which must be a fractional power)

A1: $5x^{\frac{5}{2}} - 10x^{\frac{3}{2}} - 9x^{\frac{1}{2}} + c$ (including the $+c$)

(b)(i)

M1: Substitutes in the limits k and 1, subtracts either way round and sets less than $6\sqrt{k} + 14$. Do not be concerned if an equals or an inequality sign is used.

dM1: Attempts to rearrange their inequality and either takes out a factor or cancels by $k^{\frac{1}{2}}$ leading to a 3TQ. Do not be concerned if an equals or an inequality sign is used. It is dependent on the first method mark.

A1*: $k^2 - 2k - 3 < 0$ with no errors seen and all stages of working shown

(ii)

M1: Finds the critical values for the given inequality and selects $k < a$ where a is their larger critical value. Condone e.g. $-1 < k < a$

A1: $2 < k < 3$ only (or equivalent)