6. $\int_{-5}^{2} (10-3x)^{-1/2}\,dx$

$= \left[\frac{(10-3x)^{1/2}}{\frac{1}{2}\times -3}\right]_{-5}^{2} = \left[\frac{\sqrt{10-3x}}{-3/2}\right]_{-5}^{2} = \left[\frac{2\sqrt{10-3x}}{-3}\right]_{-5}^{2}$

$= \left(\frac{2\sqrt{10-3(2)}}{-3}\right) - \left(\frac{2\sqrt{10-3(-5)}}{-3}\right)$

$= \left(\frac{2\sqrt{4}}{-3}\right) - \left(\frac{2\sqrt{25}}{-3}\right)$

$= -\frac{4}{3} - -\frac{10}{3} = -\frac{4}{3} + \frac{10}{3} = \frac{6}{3} = 2$

Question	Generic Scheme	Illustrative Scheme	Max Mark
6.	$\bullet^1$ start to integrate	$\bullet^1$ $\dfrac{(10-3x)^{\frac{1}{2}}}{\frac{1}{2}}\ldots$	**4**
	$\bullet^2$ complete integration	$\bullet^2$ $\ldots\times-\dfrac{1}{3}$	
	$\bullet^3$ process limits	$\bullet^3$ $-\dfrac{2}{3}(10-3(2))^{\frac{1}{2}}-\left(-\dfrac{2}{3}(10-3(-5))^{\frac{1}{2}}\right)$	
	$\bullet^4$ evaluate integral	$\bullet^4$ 2	

Notes:

1. For candidates who **differentiate throughout** or make **no attempt to integrate**, award 0/4.
2. If candidates start to integrate individual terms within the bracket or attempt to expand a bracket or use another invalid approach no further marks are available.
3. Do not penalise the inclusion of '$+c$' or the continued appearance of the integral sign after $\bullet^1$.
4. $\bullet^3$ is only available for substitution into an expression which is equivalent to the integrand obtained at $\bullet^2$.
5. The integral obtained must contain a non-integer power for $\bullet^4$ to be available.
6. $\bullet^4$ is only available to candidates who deal with the coefficient of x at the $\bullet^2$ stage. See Candidate A.

Commonly Observed Responses:

Candidate A

$\dfrac{(10-3x)^{\frac{1}{2}}}{\frac{1}{2}}$ $\bullet^1$ ✓ $\bullet^2$ ^

$2(10-3(2))^{\frac{1}{2}}-2(10-3(-5))^{\frac{1}{2}}$ $\bullet^3$ ✓ 1

-6 $\bullet^4$ ✓ 2 Note 6

Candidate B - NOT differentiating throughout

$-\dfrac{1}{2}(10-3x)^{-\frac{3}{2}}\times-\dfrac{1}{3}$ $\bullet^1$ ✗ $\bullet^2$ ✓

$\dfrac{1}{6}(10-3(2))^{-\frac{3}{2}}-\dfrac{1}{6}(10-3(-5))^{-\frac{3}{2}}$ $\bullet^3$ ✓ 1

$\dfrac{39}{2000}$ $\bullet^4$ ✓ 1

Candidate C

$\dfrac{(10-3x)^{\frac{1}{2}}}{\frac{1}{2}}\times-3$ $\bullet^1$ ✓ $\bullet^2$ ✗

$-6(10-3(2))^{\frac{1}{2}}-\left(-6(10-3(-5))^{\frac{1}{2}}\right)$ $\bullet^3$ ✓ 1

18 $\bullet^4$ ✓ 1

Candidate D - integrating over two lines

$\dfrac{(10-3x)^{\frac{1}{2}}}{\frac{1}{2}}$

$\dfrac{(10-3x)^{\frac{1}{2}}}{\frac{1}{2}}\times-\dfrac{1}{3}$ $\bullet^1$ ✓ $\bullet^2$ ^

$-\dfrac{2}{3}(10-3(2))^{\frac{1}{2}}-\left(-\dfrac{2}{3}(10-3(-5))^{\frac{1}{2}}\right)$ $\bullet^3$ ✓ 1

2 $\bullet^4$ ✓ 1