

Q	Marking instructions	AO	Marks	Typical solution
5	Uses a suitable substitution $u = 4x + 1$ or $u = \sqrt{4x + 1}$ OE	3.1a	M1	$u = 4x + 1 \Rightarrow \frac{du}{dx} = 4$
	Differentiates their substitution correctly	1.1b	A1	$x = -\frac{1}{4} \Rightarrow u = 0$
				$x = 6 \Rightarrow u = 25$
	Completes substitution to obtain correct integrand for their suitable substitution. Can be unsimplified.	1.1a	M1	$x = \frac{u-1}{4}$
	Correctly integrates their simplified integrand provided it is of the form $A\left(u^{\frac{3}{2}} - u^{\frac{1}{2}}\right)$ or $B(u^4 - u^2)$	1.1a	A1	$\int_{-\frac{1}{4}}^6 x\sqrt{4x+1} dx = \int_0^{25} \frac{u-1}{4} \sqrt{u} \frac{1}{4} du$ $= \frac{1}{16} \int_0^{25} u^{\frac{3}{2}} - u^{\frac{1}{2}} du$ $= \frac{1}{16} \left[ \frac{2u^{\frac{5}{2}}}{5} - \frac{2u^{\frac{3}{2}}}{3} \right]_0^{25}$ $= \frac{1}{8} \left( \frac{25^{\frac{5}{2}}}{5} - \frac{25^{\frac{3}{2}}}{3} \right)$ $= \frac{875}{12}$
Substitutes correct limits for their substitution or 6 and -1/4 for x	1.1a	M1		
Completes rigorous argument to show the required result. AG	2.1	A1		
	<b>Total</b>		<b>6</b>	