Question 31380

One knows that $y'(x)=\frac{dy}{dx}=\sqrt{2x+1}$, thus

$y(x)=\int \sqrt{2x+1}\,dx=[t=2x+1;\,dt=2\,dx]=\frac{1}{2}\int \sqrt{t}=\frac{t^{3/2}}{3}+C=\frac{(2x+1)^{3/2}}{3}+C$.

Also the point $(4;5)$ belongs to the graph of the function, hence $5=\frac{9^{3/2}}{3}+C=9+C\Rightarrow C=-4$.

Finally, $y(x)=\frac{(2x+1)^{3/2}}{3}-4$.