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Find $f'(x)$
| Past Paper Question | C1 Edexcel June 2014
Q10(a)

A curve with equation $y = f(x)$ passes through the point (4, 25).

Given that $f'(x) = \frac{3}{8}x^2 - 10x^{-\frac{1}{2}} + 1$, $x > 0$

find $f(x)$, simplifying each term. (5)

$$\begin{aligned}y = f(x) &= \int \left(\frac{3}{8}x^2 - 10x^{-\frac{1}{2}} + 1 \right) dx \\&= \frac{3}{8} \left(\frac{x^3}{3} \right) - 10 \frac{x^{\frac{1}{2}}}{\frac{1}{2}} + x + c \\&= \frac{x^3}{8} - 20x^{\frac{1}{2}} + x + c \quad \textcircled{1}\end{aligned}$$

when $x=4$, $y=25$ Sub in $\textcircled{1}$

$$\therefore 25 = \frac{4^3}{8} - 20\sqrt{4} + 4 + c$$

$$\therefore 25 = 8 - 40 + 4 + c$$

$$\therefore c = 53$$

Sub in $\textcircled{1}$

$$\therefore f(x) = \frac{x^3}{8} - 20x^{\frac{1}{2}} + x + 53$$

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