Given $f(x) = x^5 - 3x^3 + 5$ find $(f^{-1})'(13)$.

$x^5 - 3x^3 + 5 = 13 \longrightarrow x = 2$

Since $(2, 13)$ is on $f \longrightarrow (f^{-1})'(13) = \frac{1}{f'(2)}$.

$f'(x) = 5x^4 - 9x^2$

$f'(2) = 44$

$\therefore (f^{-1})'(13) = \frac{1}{44}$

Show that $f(x) = \frac{3x-1}{2x+4}$ has an inverse.

$$f'(x) = \frac{7}{2(x+2)^2}$$

f has an inverse because

$f'(x) \geq 0 \ \forall x$ in f.

Given $f(x) = e^{5x+3}$ find $f^{-1}(x)$.

Let $y = f(x)$

$y = e^{5x+3}$

$\ln y = 5x + 3$

$5x + 3 = \ln y$

$5x = -3 + \ln y$

$x = \frac{-3 + \ln y}{5}$

$f^{-1}(y) = \frac{-3 + \ln y}{5}$

$f^{-1}(x) = \frac{-3 + \ln x}{5}$.