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

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

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

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

$$f'(2) = 44$$

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

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

✓ let $y = f(x)$

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

$$\ln y = 3x + 5$$

$$3x + 5 = \ln y$$

$$3x = -5 + \ln y$$

✓ $$x = \frac{-5 + \ln y}{3}$$

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

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