

Find the derivative of  $f(x) = e^{\frac{1}{x}}$

1) First copy the part that's  $e^{\frac{1}{x}}$ , and then differentiate  $\frac{1}{x}$

2)  $f'(x) = e^{\frac{1}{x}} \frac{d}{dx} \left( \frac{1}{x} \right)$  This is the chain rule.

3)  $f'(x) = e^{\frac{1}{x}} \frac{d}{dx} x^{-1}$  Rewrite  $\frac{1}{x}$  to show the exponent of -1

4)  $f'(x) = e^{\frac{1}{x}} (-1)(x^{-1-1})$  Bring the -1 down, and subtract 1 from the 1 in the exponent

5)  $f'(x) = e^{\frac{1}{x}} (-1)(x^{-2})$  Complete the subtraction in the exponent

6)  $f'(x) = \frac{-e^{\frac{1}{x}}}{x^2}$  Rewrite by placing the -1 in front and by rewriting  $x^{-2}$  in the bottom.