Example: Let $f(x) = \dfrac{x^2+7x-2}{x^2-2}$. Find $f'(x)$.

lo d-hi hi d-lo

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

lo^2

OR

$$= \frac{2x^3 - 4x + 7x^2 - 14 - 2x^3 - 14x^2 + 4x}{(x^2-2)^2}$$

$$= \boxed{\frac{-7x^2-14}{(x^2-2)^2}}$$

Example: Let $f(x) = \frac{5x+6}{\sqrt{x}}$. Find $f'(x)$.

$$= 5x^{1/2} + 6x^{-1/2}$$

$$f'(x) = 5\left(\frac{1}{2}x^{-1/2}\right) + 6\left(\frac{-1}{2}x^{-3/2}\right)$$

$$= \frac{5}{2}x^{-1/2} - 3x^{-3/2}$$

OR

$$f'(x) = \frac{\sqrt{x}(5) - (5x+6)\left(\frac{1}{2}x^{-1/2}\right)}{(\sqrt{x})^2}$$

$$= \frac{5\sqrt{x} - \frac{5}{2}x^{1/2} - 3x^{-1/2}}{x}$$

$$= \frac{\frac{5}{2}x^{1/2} - 3x^{-1/2}}{x} = \frac{5}{2}x^{-1/2} - 3x^{-3/2}$$