Calculus I
Derivative of $\frac{a}{x} = ax^{-1}$

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Example (Constant Multiple Rule, Power Rule, Negative Exponent)

Find the derivative of $t = \dfrac{2\pi}{x^4}$.

$$t = (2\pi)\left(x^{-4}\right).$$

$$\frac{\mathrm{d}t}{\mathrm{d}x} = \frac{\mathrm{d}}{\mathrm{d}x}\left[(2\pi)\left(x^{-4}\right)\right]$$

Constant Multiple Rule:

$$= (2\pi)\frac{\mathrm{d}}{\mathrm{d}x}\left(x^{-4}\right)$$

$$= (2\pi)\left(-4x^{-5}\right)$$

$$= -\frac{8\pi}{x^5}.$$