Calculus I
Derivative of reciprocal of linear polynomial squared

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Example (Constant Multiple Rule, Power Rule)

Find the derivative of $\quad y = \dfrac{2x^5}{7}$.

$$y = \left(\frac{2}{7}\right)\left(x^5\right).$$

$$\frac{\mathrm{d}y}{\mathrm{d}x} = \frac{\mathrm{d}}{\mathrm{d}x}\left[\left(\frac{2}{7}\right)\left(x^5\right)\right]$$

Constant Multiple Rule: $\quad = \left(\dfrac{2}{7}\right)\dfrac{\mathrm{d}}{\mathrm{d}x}\left(x^5\right)$

$$= \left(\frac{2}{7}\right)\left(5x^4\right)$$

$$= \frac{10x^4}{7}.$$

Example (Constant Multiple Rule, Power Rule)

Find the derivative of $u = -x$.

$$u = (-1)(x).$$

$$\frac{\mathrm{d}u}{\mathrm{d}x} = \frac{\mathrm{d}}{\mathrm{d}x}[(-1)(x)]$$

Constant Multiple Rule: $\quad = (-1)\frac{\mathrm{d}}{\mathrm{d}x}(x)$

$$= (-1)(1)$$

$$= -1.$$