

Bell Ringer - Simplify

$$\frac{2xy^4}{5xy^2} \cdot \frac{-30xy}{2x^2y}$$

$$\frac{-\cancel{6}^6 \cancel{0}^1 \cancel{x}^1 y^{\cancel{4}^2}}{\cancel{1}^1 \cancel{0}^1 \cancel{x}^1 y^{\cancel{3}^2}} = \frac{-6y^2}{x}$$

$$\frac{-\cancel{2} \cdot \cancel{2} \cdot \cancel{3} \cdot \cancel{5} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{y} \cdot \cancel{y} \cdot \cancel{x} \cdot \cancel{y} \cdot \cancel{y}}{\cancel{2} \cdot \cancel{5} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{y} \cdot \cancel{y} \cdot \cancel{y}}$$

Exponential Growth and Decay Functions

Growth and decay functions allow us to model situations where a quantity is growing or decreasing by the same **percent** over a period of time.

These differ from linear functions ($y = mx + b$) which allow us to model situations where a quantity has a **consistent rate of change** over a period of time.

Growth Model $y = C (1 + r)^t$

Decay Model $y = C (1 - r)^t$

C = initial amount / starting value

r = growth/decay percent as a decimal

t = time period (minutes, hours, days, years)

Growth Factor $(1 + r)$

Decay Factor $(1 - r)$

Examples of Growth

- 1) Bacteria growth
- 2) Interest growth on an investment

Examples of Decay

- 1) Depreciation of a vehicle
- 2) Carbon dating of fossils

1. You deposit \$1000 into a savings bond. It grows 3.5% each year. How much is it worth after 15 years?

$$Y = C(1+r)^t$$

$$Y = 1000(1 + .035)^{15}$$

$$Y = 1000(1.035)^{15}$$

$$Y = \$1675.35$$

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phone x^y
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2. You buy a boat for \$8400. It depreciates 8% in value per year. How much is it worth in 5 years? What was its loss of value after 10 years?

$$Y = C(1 - r)^t$$

$$Y = 8400(.92)^5$$

$$Y = \$5536.28$$

$$Y = 8400(.92)^{10}$$

$$Y = 3648.86$$

$$\begin{array}{r} 8400.00 \\ - 3648.86 \\ \hline 4751.14 \end{array}$$

3. A tadpole weighs .01g when born. It gains 5% of its weight each day for the first 8 weeks it is alive. How much does it weigh after 8 weeks?

$$Y = C(1 + r)^t$$

$$Y = .01(1.05)^{56} \leftarrow \begin{array}{l} 7 \times 8 \\ 7 \text{ days} \times 8 \text{ weeks} \end{array}$$

$$Y = .15g$$