

Warm up

- Hayden bought 6 tickets to a football game online. The online service fee is 5%. Let x be the cost of one ticket. Write an expression to represent the total cost of the tickets.
- Traci buys 4 movies at Great Buy. The movies were all the same price and she received a 20% discount. Let x be the cost of one movie. Write an expression to represent the total cost of the movies.

starting point $\leftarrow b(1 \pm \%) \rightarrow \div 10$

Notes:

Exponential Growth: $y = b(1 + \%)^t$

b starting $\%$ $\div 100$ t time

A college's tuition has risen 5% each year since 2000. $5 \div 100 = 0.05$

- a. If the tuition in 2000 was \$10,850, write an equation for the amount of the tuition t years after 2000.

$$y = 10850(1 + 0.05)^t$$

- b. Predict the cost of tuition for this college in 2015.

$$10850(1 + 0.05)^{15} = 22556.37075$$

\$22556.37

Exponential Decay: $y = b(1 - \%)^t$

b starting $\%$ $\div 100$ t time

A fully inflated child's raft for a pool is losing 6.6% of its air every day. The raft originally contained 4500 cubic inches of air.

- a. Write an equation to represent the loss of air.

$$y = 4500(1 - 0.066)^t$$

$6.6 \div 100 = 0.066$

- b. Estimate the amount of air in the raft after 7 days.

$$4500(1 - 0.066)^7 = 2790.234135$$

Growth or Decay

Which of the following models the fastest exponential growth? Which models the fastest decay?

- $1.2(0.85)^t$ ← Fastest decay
 - $0.85(1.2)^t$ ← Fastest growth
 - $1.15(0.86)^t$
 - $0.86(1.15)^t$
- # With the exponent that is biggest
- # With the exponent that is smallest

1. A stock is declining at a rate of 75% of its value every week. Write an equation to represent the situation if the stock started at \$225.

$$y = 225(1 - 0.75)^t$$

2. The population of a big city is increasing at a rate of 2.5% per year. The city's current population is 67,000. Write an equation to represent how the population is growing.

$$y = 67000(1 + 0.025)^t$$

3. Sodalicious has been increasing their revenue by 0.45% each month. They started out with a revenue of \$3000. Write an equation to represent their revenue after x months.

$$y = 3000(1 + 0.0045)^t$$

4. The number of people who have a landline phone has decreased by 17.5% annually since 1990. Assume that 6 million people had a landline in 1990. Write an equation that can be used to calculate the number of people who have a landline since 1990.

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increasing risen / rising gain earns interest profit growing	decreasing decline / declining losing depreciate falling