

# Exponential Decay

$$y = P(1 - r)^t$$



**PACIFIC NW**  
FEDERAL CREDIT UNION

Name \_\_\_\_\_

# Exponential Decay

**Directions: Please write an exponential decay function to model each situation. Then find the value of the function after the given amount of time.**

1. You buy a new Toyota Camry in 2013 for \$23,000. If you sell it in 7 years with an average rate of depreciation of 10% per year, how much will you be able to sell it for?

**Function:**

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**Value:**

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2. You bought a new Range Rover in 2015 for \$82,900. If you sell it in 5 years with an average rate of depreciation of 13% per year, how much will you be able to sell it for?

**Function:**

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**Value:**

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## Other ways to apply Exponential Decay –

3. The population of a town is 2500 and is decreasing at a rate of 3% per year; 5 years

**Function:**

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**Value:**

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4. You own a T-shirt company. The value of your printing equipment is \$25,000 and decreases at a rate of 15% per year; 8 years

**Function:**

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**Value:**

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5. A population of 2,300 manatees in Florida is thought to be decreasing at a rate of 1.1%; 7 years

**Function:**

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**Value:**

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6. An app has a monthly user rate of 1,200 people. Participation is decreasing at a rate of 2% per month; 18 months

**Function:**

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**Value:**

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## Exponential Growth and Decay – Review

**Directions:** Determine if the given situation represents growth or decay and write the function to model the situation. Then find the value of the function after the given amount of time.

1. Annual sales at a clothing store are \$475,000 and increasing at a rate of 6.5% each year; 9 years

**Function:**

\_\_\_\_\_

**Value:**

\_\_\_\_\_

2. The population of a town is 1,600 residents and decreasing at a rate of 3.8 per year; 6 years

**Function:**

\_\_\_\_\_

**Value:**

\_\_\_\_\_

3. The population of a school is 850 students and is increasing at a rate of 2% per year; 6 years

**Function:**

\_\_\_\_\_

**Value:**

\_\_\_\_\_

4. Per capita income is the total income for a geographic area divided by the number of people in that area. In Oregon, our per capita personal income (PCPI) was \$49,908 in 2018. If it increases by 2.5% per year what will Oregon's (PCPI) be after 10 years?

**Function:**

\_\_\_\_\_

**Value:**

\_\_\_\_\_

5. Monthly car sales for a certain type of car are \$400,000 and are decreasing at a rate of 3% per month; 6 months

**Function:**

\_\_\_\_\_

**Value:**

\_\_\_\_\_

6. A condo in downtown Portland was worth \$80,000 in 1990. The value of the condo increased by an average of 3% each year. Find the value of the condo in 2020.

**Function:**

\_\_\_\_\_

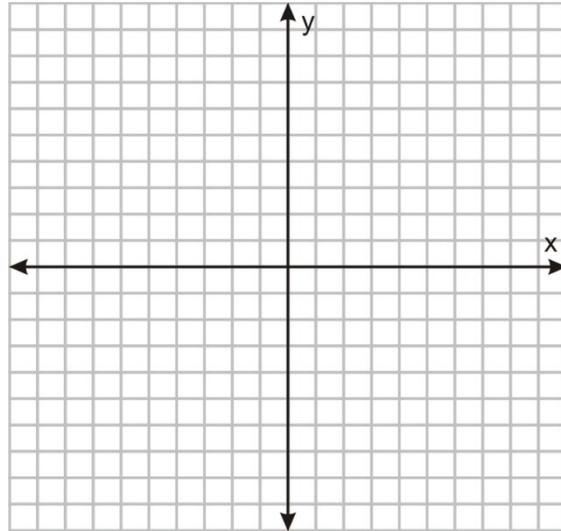
**Value:**

\_\_\_\_\_

## Exponential Models

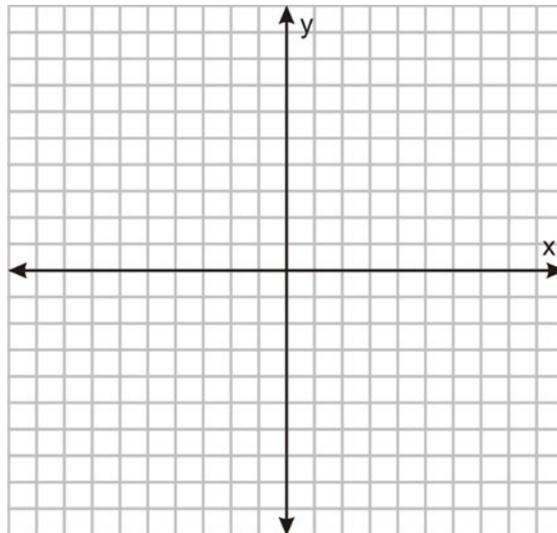
1. The sea lion population in a harbor is 85 and decreasing by 3% each year. Fill in the chart for the population after the given amount of time (t). Use your data set to graph the exponential decay.

<b>t (x)</b>	<b>y</b>
1	
3	
5	
7	



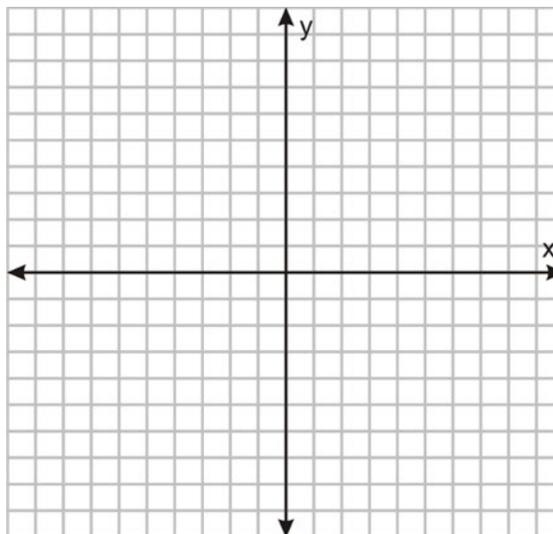
2. A small town, population 57, just had a large company open a new facility. After the grand opening the company said they plan to expand their workforce by 7% each year. Graph the growth after the given number of years.

<b>t (x)</b>	<b>y</b>
2	
4	
6	
8	
10	



3. The price of Honeycrisp Apples has been increasing steadily each year by 7%. If the price per pound in 2010 was \$1.27 find the price for each year after.

<b>t (x)</b>	<b>y</b>
2012	
2014	
2016	
2018	
2020	



4. What observations are you able to make from looking at your 3 graphs representing exponential functions?

5. Write your own exponential growth or decay story line. Include all the necessary information. Write a function, chart it and graph it.

**Information:**

**Function:** \_\_\_\_\_

**Chart:**

<b>t (x)</b>	<b>y</b>

