Objective   Percent Increase and Percent Decrease

Warm-Up

Determine each product, rounding to the nearest penny. Describe whether the product represents an increase or decrease.

1. $450 × 1.5 = y

Sample worked out

$$\$450 \times 1.5 = y$$

initial value — | value multiplier

450 × 1.5 = **675** ⟵ **675 is increase**

2. y = $36 × 0.9

3. $100 × 1.1 = y

4. $250 × 0.99 = y

Up or Down?

Tell whether each situation represents an increase or a decrease in spending.

1. A $20 shirt is on sale for $16.

2. The cost of a movie ticket in the afternoon is $6.50, and it is $8.00 after 5:00 p.m.

3. A ride-all-day amusement park ticket last season was $27, and this season it is $35.

4. The cost of lunch yesterday was $5.50, and the cost of lunch today is $5.25.

You have used percents in many different situations. You can also use percents to describe a change in quantities.

A **percent increase** occurs when the new amount is greater than the original amount, such as when stores mark up the price they pay for an item to make a greater profit.

1. All That Glitters Jewelry Store marks up its prices so it can maximize its profits. What is the percent increase for each item? Use the formula shown to complete the table.

$$\text{Percent Increase} = \frac{\text{Amount of Increase}}{\text{Original Amount}}$$

All That Glitters Accounting Sheet				
Item	Cost (dollars)	Customer's Price (dollars)	Difference (dollars)	Percent Increase
Initial ring	60	90		
ID bracelet	120	240		
Earrings	25	50		
Pin	36	45		

A percent decrease occurs when the new amount is less than the original amount. An example of a percent decrease is the amount water evaporates over time. Water evaporates at different rates, depending on the size and shape of the container it is in and the air temperature.

2. A science class is conducting an experiment to determine how fast water evaporates. They fill 4 differently shaped containers with water and measure the level once at the beginning of the experiment and once at the end. Use the formula shown to complete the table.

$$\text{Percent Decrease} = \frac{\text{Amount of Decrease}}{\text{Original Amount}}$$

Container	Starting Height (cm)	Ending Height (cm)	Difference (cm)	Percent Decrease
A	7.1	4.5		
B	2.3	0.9		
C	3.8	2.9		
D	9.2	7.6		

3. How do you know if the percent is a decrease or increase?

4. How would you describe a 50 percent decrease?

5. How would you describe a 100 percent increase?

6. Use Brendon's and Martina's methods to determine each percent increase or decrease.

a. A ticket originally cost $20, but its price decreases by 20%.

b. Shawna is making $12 per hour. She gets a 6% increase in pay.

c. This month's rainfall is 30% less than last month's total of 3.5 inches.

d. Yvette's family home is 1600 square feet. They hope to increase the area by 10%.

Generally, things like homes and savings accounts gain value, or appreciate over time. Other things, like cars, depreciate every year.

New cars depreciate about 12% of their value each year.

1. How much would a new car depreciate the first year if it costs:
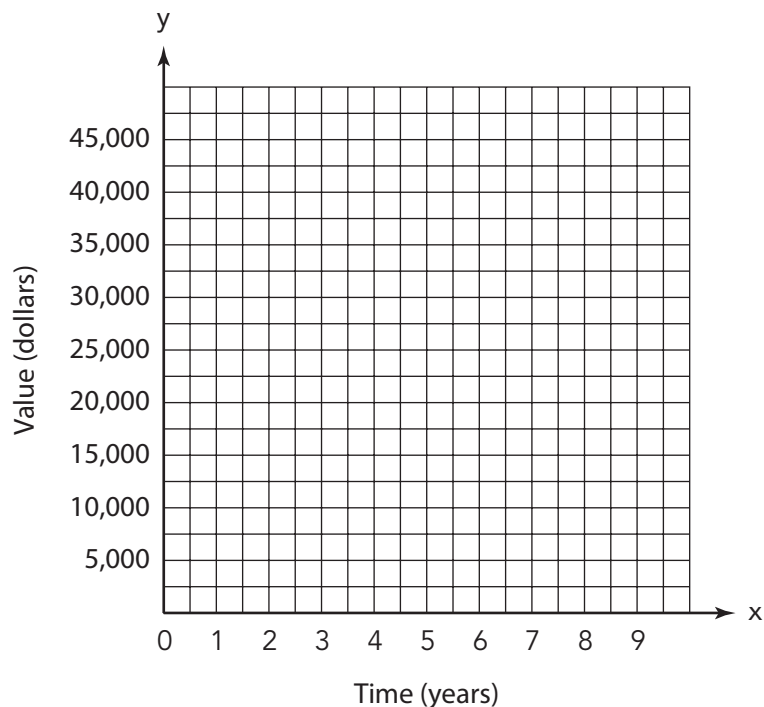**a. $35,000?**

b. $45,000?

c. $20,000?

2. If a car lost $3600 in depreciation in the first year, what is the original cost of this car?

3. Copy and complete the table to record the value of a car that costs $50,000 and depreciates at the rate of 12% per year for the first five years

Time (years)	Value of the Car (dollars)
0	50,000
1	
2	
3	
4	
5	

4. Complete the graph.

5. Would it make sense to connect the points on the graph? If so, connect the points. Explain your reasoning.

6. Describe how the value of the car decreases over time.

7. Is the relationship between time and the car's value proportional? Explain how you know using the graph and the completed table of values.

Homework HW

LESSON 4.4a
More Ups and Downs

Objective   Percent Increase and Percent Decrease

Review

1. A T-shirt that costs $14 without tax costs $14.98 with tax. What is the sales tax percent?

2. A car that costs $14,000 without tax costs $14,700 with tax. What is the sales tax percent?

3. Identify the constant of proportionality in each situation.

   a. The temperature rises 4 degrees each hour for 10 hours.

   b. Two thirds of the floats in the parade have flowers.

4. Rewrite each algebraic expression with fewer terms.

   a. $9.5(a + 4) - a$

   b. $8 + h - 2 \times 5$