

# Warm Up

11/30



The equation below models the growth of a population of grasshoppers each year. Define all parts of the exponential equation in the context of the problem:

$y = 40(3^x)$

Number of grasshoppers on year "x"

there were 40 grasshoppers when we started observing

the population is multiplied by 3 each year

# of years we have been observing

$y = 40(3^x)$

# of grasshoppers at year 'x'

there were 40 grasshoppers at year 0

the # of grasshoppers is multiplied by 3 each year

# of years since we started measuring

## How do we calculate percent change?

Ann works in a supermarket for \$10.00 per hour. If her pay is increased to \$12.00, then what is her percent increase in pay?



How much did her salary change? + \$2

What did her salary start at? \$10

So ... we need to find out what percent  $\frac{2}{10}$  is of  $\frac{10}{10}$ .

$$\frac{2}{10} = 0.2 \quad \leftarrow \% \text{ as a decimal}$$

$$0.2 \cdot 100 = 20\%$$

How do we calculate percent change?

$$\text{Percent Change} = \frac{\text{New Value} - \text{Old Value}}{\text{Old Value}} \times 100$$

$$= \frac{\overbrace{12 - 10}^{\text{change in salary}}}{10} \cdot 100 = 20\%$$



This is what we do when looking for a growth factor

Let's try it!

x	y
0	4 > $\frac{8}{4} = 2$
1	8 > $\frac{16}{8} = 2$
2	16 > $\frac{32}{16} = 2$
3	32

Dividing UP the table

Ann works in a supermarket for \$10.00 per hour. If her pay is increased to \$12.00, then what is her percent increase in pay?

$$\frac{\text{New}}{\text{Old}} = \frac{12}{10} = 1.2$$

← 120%

$$100\% + 20\% = 120\%$$

↑                      ↑  
 original            % increase





Let's try it!

Ann works in a supermarket for \$10.00 per hour. If her pay is increased to \$12.00, then what is her percent increase in pay?

$$\frac{\text{New}}{\text{Old}} = \frac{12}{10} = 1.2$$

120%

⇓

100% + 20%

what her  
original  
salary  
was

additional  
salary

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## Let's try a decrease problem!

The staff at a company went from 40 to 29 employees. What is the percent decrease in staff?

$$\frac{\text{New} - \text{Old}}{\text{Old}} = \frac{29 - 40}{40} \cdot 100 = \frac{-11}{40} \cdot 100 = -27.5\%$$

negative  
because  
they lost  
workers

27.5% decrease

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$$\frac{\text{New}}{\text{Old}} = \frac{29}{40} = .725 = 72.5\%$$

% of staff  
remaining

How do we find % change?

$$100 - 72.5 = 27.5\%$$

Initial percent

% of staff  
remaining

27.5% decrease

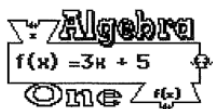
## Classwork

*Do the classwork in the following order:*

On Front: 1-9 and 12

Complete Back

On Front: 10 and 11



# Percent of Change Worksheet

Name \_\_\_\_\_

Period \_\_\_\_\_

**Directions:** State whether each percent of change is a percent increase or a percent decrease. Then find the percent of increase or decrease. Round to the nearest whole percent.

1. Original: \$100  
New: \$59
2. Original: 324 people  
New: 549 people

$$\frac{59}{100} = 0.59$$

59% remaining  
41% ↓

$$\frac{\text{New} - \text{Old}}{\text{Old}} \cdot 100 = -41\%$$

41% decrease

3. Original: 58 Homes  
New: 152 Homes
4. Original: 66 Dimes  
New: 30 Dimes

5. Original: \$53  
New: \$75
6. Original: 15.6 liters  
New: 11.4 liters

7. Original: \$3.78  
New: \$2.50
8. Original: 231.2 mph  
New: 236.4 mph

**Directions:** Find the final price of each item. When there is a discount and sales tax, first compute the discount price and then compute the sales tax and final price.

9. DVD: \$219  
sales tax: 6.5%
10. jeans: \$39.99  
discount: 15%  
sales tax: 4%

11. book: \$19.95  
discount: 5%  
sales tax: 5%
12. tickets: \$52.50  
sales tax: 7%





Solve each problem.

- 1) In February Roger spent 44 hours watching Netflix. In March he only spent 25.52 hours watching. What was the percent decrease in the amount of time he spent watching?
- 2) At a restaurant the bill came to \$54.00. If you leave \$61.56, what percent tip is that?
- 3) A library normally collected \$56.00 in fees a month. But in March they collected \$84.00. What is the percent increase in the number of fees collected in March?
- 4) A pole was supposed to be 14 meters long, but it was accidentally made 21 meters long. The pole is \_\_\_\_\_ percent longer than it needs to be.
- 5) The price for internet on a phone was \$10.00 a month, but starting in November the price will be \$13.20 a month. This is a \_\_\_\_\_% increase.
- 6) Last year a fishing license cost \$59.00. This year the license will cost \$44.84. This is a \_\_\_\_\_ percent decrease.
- 7) A store sold 13.00 dollars worth of gift cards in October. The next month the goal was to sell \$17.16 worth of gift cards. This is an increase of \_\_\_\_\_ percent.
- 8) Isabel's family decided to get rid of their cable TV. Originally they were paying \$143.00 for the TV, internet and phone, but now they're paying \$125.84. What was the percent the bill decreased by?
- 9) A store normally averaged 102 customers a day. But on the weekends they averaged 75.48 customers a day. What is the percent decrease in the number of customers?
- 10) Normally a game costs \$33.00. But the new special edition version is going to be \$39.60. This is an increase of \_\_\_\_\_ percent.

Answers

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

# Homework

Finish classwork

