Geometry Lomac 2015-2016	Date 11/17 due 11/18	Exponential Models Percent Growth and Decay Multipliers	5.4L

Name _____ **Per**_____

LO: I can find percent growth or decay with a single multiplier.

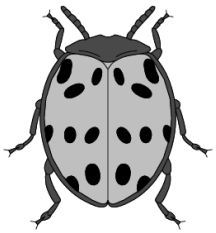
emath 6.6

☐ **DO NOW** On the back of this packet

☐ (1) **Percent Growth with a single multiplier**

In the last lesson we learned a quick way to find a percent of a total. In this lesson, we would like to develop and understand methods for increasing and decreasing a number by a certain percent. We will start with the increasing case.

***Exercise* #1:** Agronomists are studying how quickly the population of an invasive species of beetle will increase in a controlled farm setting. They calculate that the population is increasing at a steady rate of 6% per week. At the beginning of the week, the population was 350 beetles.



(a) Find the population of beetles a week later by first finding 6% of 350 and adding it to the original population.

(b) Find the population of beetles a week later by a single multiplication. Why does this work?

(c) What will be the beetle population after two weeks?

☐ (2) **More Percent Growth with a single multiplier**

The ability to increase a total by a certain percent using this method is important. Get some **fluency** with it in the next problem.

***Exercise* #2:** Find the result of each of the following. Many of your answers will involve decimals. Do not round.

(a) Increasing 440 by 12%

(b) Increasing 68 by 8%

(c) Increasing 120 by 3.5%

☐ (3) **More Percent Growth with a single multiplier**

***Exercise* #3:** Adriana has a saving account that promises to increase her balance by 2.5% per year. If she deposits $720 in it at the beginning of the year, which of the following would be her balance at the end of the year if she does not withdraw or deposit any additional money?

(1) $900 (3) $738

(2) $842 (4) $756

☐ (4) **Percent Decay with a single multiplier**

We would also like to work with decreasing by a certain percent. This will follow a similar, if not identical, pattern to the increasing case. Again, let's understand what is going on with an introductory problem.

***Exercise* #4:** A cup of coffee is cooling down such that its temperature is decreasing at a constant rate of 8% per minute. Let's say the coffee starts at a temperature of 200 $^{\circ}$F.

(a) Find its temperature after one minute by finding 8% of 200 and then subtracting.

(b) Find its temperature after one minute by finding a single product. How can you interpret this in terms of the 8%?

(c) What will the temperature of the coffee be after two minutes? Round to the nearest degree.

☐ (5) **More Percent Decay with a single multiplier**

Decreasing by a certain percent is an important skill to be **fluent with** as well. It often is harder for students because they need to think about **what percent remains**.

***Exercise* #5:** The enrollment of students at a school is decreasing at a constant rate of 5% per year.

(a) What percent remains after one year?

(b) If the population this year is 2300, what will its population be next year? Do in a single calculation.

***Exercise* #6:** Find the result of each of the following. Many of your answers will involve decimals. Do not round. Write the calculations you use to find yours answers.

(a) Decrease 620 by 10%

(b) Decrease $22.50 by 8%

(c) Decrease 122 by 3.5%

***Exercise* #7:** The cost of gasoline has decreased recently by 4.5%. If it started at $3.80 per gallon, which of the following is its price after the decrease?

(1) $3.63/gal

(3) $3.22/gal

(2) $3.72/gal

(4) $3.97/gal

☐ (6) **Finding percent with multipliers**

REASONING

Percents build on one another in strange ways. It would seem that if you increased a number by 5% and then increased its result by 5% more, the overall increase would be 10%.

7. Let's do exactly this with the easiest number to handle in percents.

   (a) Increase 100 by 5%

   (b) Increase your result form (a) by 5%.

   (c) What was the overall percent increase of the number 100? Why is it not 10%?

☐ (7) **Exit Ticket**

ON THE LAST PAGE

☐ (8) cont. **Homework**

FLUENCY

1. Perform each of the following calculations using a single multiplication. Show the product that you use to find your final answer. Do not round your final answers.

   (a) Increase 350 by 5%

   (b) Increase 120 by 10%

   (c) Increase 34 by 2%

   (d) Increase \$450 by 3.5%

   (e) Increase \$1,300 by $6\frac{1}{2}\%$

   (f) Increase 2,698 by $2\frac{3}{4}\%$

2. Perform each of the following calculations using a single multiplication. Show the product that you use to find your final answer. Do not round your final answers.

   (a) Decrease 160 by 10%

   (b) Decrease 450 by 6%

   (c) Decrease 122,000 by 12%

   (d) Decrease \$1,820 by 3%

   (e) Decrease \$12,500 by 15%

   (f) Decrease \$4.50 by 8%

APPLICATIONS

3. A population of bacteria is growing at a rate of 20% per hour. If the population starts at 320, what is it an hour later?

   (1) 360

   (3) 372

   (2) 356

   (4) 384

4. The price of oil, in dollars per barrel, declined last week by 3.5%. If it started the week at \$102.00 per barrel, at what per barrel price did it end the week?

   (1) \$98.43

   (3) \$99.12

   (2) \$98.50

   (4) \$100.56

Exit Ticket **Name**_____ **Date** _____ _____ **Per**_ _____ **5.4L**

The LO (Learning Outcomes) are written below your name on the front of this packet. Demonstrate your achievement of these outcomes by doing the following:

(1) A savings account grows by 3% per year. Sofia places $500 in the account at the beginning of the year.

(a) How much does Sofia have at the end of the year once her $500 has been increased by 3%?

(b) How much does Sofia have at the end of the second year based on increasing your answer from part (a) by 3%?

(c) Did the amount of money in Sofia's account grow faster the first year or the second year? Explain how you arrived at your answer. Use proper units in your explanation.

DO NOW Name_____ Date _____ Per_____ 5.4L

(1) Translation to algebra progress. Write one or more algebraic statement(s) to represent this situation. Be sure to write at least one "Let" statement to define any variables.

John is packing books into boxes. Each box can hold either 15 small books or 8 large books. He needs to pack at least 35 boxes and at least 350 books. Write a system of linear inequalities to represent the situation.