

**Algebra 2 (basic) – 6.1 (trb.reteach, vs14x) Exponential Growth & Decay**

**Goal: 6.1: determine multiplier for exponential growth and decay;  
write and evaluate exponential expressions to model growth and decay situations (apply)**

**◆ Skill A** Finding the multiplier for growth or decay

**Recall** A multiplier greater than 1 models growth. A multiplier between 0 and 1 models decay.

**◆ Example**

Find the multiplier for each situation.

- a.** 5% growth      **b.** 8% decay

**◆ Solution**

- a.** Add the growth rate to 100%.  
 $100\% + 5\% = 105\%$  or 1.05  
 The multiplier is 1.05.  
**b.** Subtract the rate of decay from 100%.  
 $100\% - 8\% = 92\%$  or 0.92  
 The multiplier is 0.92.

**SOLUTIONS #1-9**

1. 1.12    2. 0.75    3. 0.925  
 4. 1.082    5. 1.01    6. 0.995  
 7. approximately 7350  
 8. approximately 8800  
 9. approximately 13,900

**Find the multiplier for each situation.**

1. 12% growth \_\_\_\_\_      2. 25% decay \_\_\_\_\_      3. 7.5% decay \_\_\_\_\_  
 4. 8.2% growth \_\_\_\_\_      5. 1% growth \_\_\_\_\_      6. 0.5% decay \_\_\_\_\_

**◆ Skill B** Writing and evaluating an exponential expression that models growth or decay  
 (You will need a calculator.)

**Recall** Any growth or decay rate related to a natural event assumes that the rate remains constant, and a prediction based on this rate will give approximate results.

**◆ Example**

The population of a small town of 10,000 people is growing at the rate of about 5.2% per year. Predict the approximate population 10 years from now.

**◆ Solution**

The multiplier is  $100\% + 5.2\% = 105.2\%$  or 1.052.  
 $10,000(1.052)^{10} \approx 16,602$ .  
 The predicted population is about 16,600.

**Use a growth or decay model to solve each problem.**

A new school district is experiencing an annual growth rate of 9.5%. The school population is now 5600 students. What is the approximate predicted population

7. 3 years from now?      8. 5 years from now?      9. 10 years from now?

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The rate in the number of reported cases of robbery is dropping at about 7% per year in a given region of the country. The number of cases reported this year was approximately 156,000. If the number continues to drop at this rate, what is the approximate predicted number of cases

10. 1 year from now?

11. 3 years from now?

12. 5 years from now?

◆ **Skill C** Using a table to find a specific value for an exponential function  
(You will need a calculator.)

◆ **Example**

Your doctor prescribes a medication for your allergies. After each 1 hour interval, only 90% of the medication present 1 hour ago remains in your system. If you take a 100-milligram tablet, in approximately how many hours will only 50% of the medication remain in your system?

◆ **Solution**

The multiplier is  $100\% - 10\% = 90\%$ , or 0.9.

Make a table for  $100(0.9)^x$ , where  $x$  is a positive integer. Use a calculator.

$x$	1	2	3	4	5	6	7
$100(0.9)^x$	90	81	72.9	65.61	59.05	53.14	47.83

50% of the medication will be left in your system between 6 and 7 hours after the initial dose.

**SOLUTIONS #10-15**

10. approximately 145,000

11. approximately 125,500

12. approximately 108,500

13. about 6

14. about 4

15. about 6

Use a calculator and table to solve each problem.

13. After 2 hours, only 75% of a new medication remains in your body. If you take an 80-milligram tablet, and this rate of decay is constant, in approximately how many hours will less than 15 milligrams remain in your system?


14. You invest \$5000 in an account that earns interest at an effective rate of 8.4% per year. In how many years will you have over \$6800 in the account?


15. If you invest \$50,000 in a high interest account that earns interest at an effective rate of 13.8% per year, how many years will it take to double your money?
