Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Growth and Decay Worksheet #2**

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**1)** Commercial non-music radio stations increased at an average annual rate of 3.1% from 1996 to 2000. Commercial radio stations in this format numbered 1262 in 1996.

a) What is starting value (y-int) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) What is the constant factor (rate of change, make sure to include the 1). \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) Write an equation that finds the number of radio stations *y* after *x* years after 1996. \_\_\_\_\_\_\_\_\_\_\_\_\_

d) If the trend continues, predict the number of radio stations in this format for 2020. \_\_\_\_\_\_\_\_\_\_\_\_\_\_

e) In what year will there be over 4000 commercial radio stations? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**2)** In 1990 the forested area of Guatemala was about 34,400 square kilometers. During the 1990’s, the forested area decreased at an average rate of 1.7% each year.

a) What is starting value (y-int) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) What is the constant factor (rate of change, make sure to include the 1.) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) Write a rule that finds the forested area *y*, after *x* years after 1990. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d) If this trend continues, predict the forested area in 2015. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e) Based on this trend, how long will it take for the forested area drop below 12, 000 km2 \_\_\_\_\_\_\_\_\_\_\_

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**3)** The Green’s bought a beach house in 2010. A rule to predict its future value is y = **610,000(1.035)x**.

a) How much did they purchase the beach house for? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) Is the value increasing or decreasing each year? How do you know? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) Find the percent increase or decrease per year for the beach house. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d) What is the value predicted to be in 2018? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e) In what year is the house projected to have a million dollar value?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**4)** The population of Osaka, Japan declined at an average annual rate of 0.05% for the five years between 2000 and 2005. The population of Osaka was 10.985 (in millions) in 2005.

a) Write a rule that can predict the future population of Osaka, Japan. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) Predict the population in 2050. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) After how many years will the population drop under 10 million? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**5)** An antique collectable was valued at $160 in 1999. The value is expected to increase at a rate of 4% each year.

a) Write a rule that can predict the value after x number of years. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) What will be the value of the antique in 2026? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) When will the value be around $300? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**6)** Tim saved $750 from a summer job. He plans to spend 10% of his savings each week on various forms of entertainment.

a) Write a rule that will show Tim’s saving *y,* after *x* number of weeks. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) How much will Tim have in savings after 15 weeks? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) After how many weeks will he have less than a dollar in savings? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Compounding Interest**

**7)** The Fresh and Green Company has a savings plan for its employees. If an employee makes an initial contribution of $1000, the company pays 8% interest compounded quarterly.

1. If an employee participating in the plan withdraws the balance after five years how much will be in the account? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. If an employee participating in the plan withdraws the balance after 35 - years how much will be in the account? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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8) What is the amount of an investment if $300 is invested at an interest rate of 6.75% compounded semiannually for 20 years?

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9) Determine the amount of an investment if $3000 is invested at a rate of 4.25% compounded monthly for 40 years.

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10) The Jones have a $12,000 in a savings account. The bank pays 3.5% interest on savings accounts, compounded monthly. Find the balance after 10 years.