Name:_____

Math 1 Classwork
Exponential Growth and Decay

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1) From 1990 to 1997, the number of cell phone subscribers *S* (in millions) in the US could be modeled by $\mathbf{S = 0.5(1.413)^t}$ where *t* is the number of years since 1990.

a) How many cell phone subscribers where there in 1990? _____

b) What is the growth factor (rate of change) in the model? _____

c) At what percentage does the number of subscribers increase by each year? _____

d) In what year was the number of cell phone subscribers about 15 million? _____

e) According to the model, what year will the number of cell phone subscribers exceed 90 million? _____

f) Estimate the number of subscribers in 2014. _____

g) Do you think this model can be used to predict future number of cell phone subscribers? Explain.

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2) From 1991 to 1995, the number of computers *C* per person worldwide can be modeled by $\mathbf{C = 0.252(1.15)^t}$ where *t* is the number of years since 1991.

a) Identify the initial amount. _____

b) Identify the growth factor (rate of change). _____

c) What is the annual percent increase? _____

d) In what year will there be an estimated 1 computer per person? _____

e) Estimate the number of computers in 2018. _____

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3) Ten grams of Carbon 14 is stored in a container. The amount C (in grams) of Carbon 14 present after t years can be modeled by $\mathbf{C = 10(0.99987)^t}$.

a) Does this function show an exponential increase or decrease? Why? _____

b) What is the % that it increases or decreases by each year? _____

c) How much Carbon 14 is present after 1000 years? _____

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4) In 2000 the tuition a private college was $25,000. During the next 9 years, tuition increased by about 2.2% each year.

a) Write a model giving the cost y of tuition at the college x years after 2000. _____

b) Estimate the year the tuition is around $37,000. _____

c) What would be the tuition today? _____

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5) A diamond ring was purchased twenty years ago for $1000. The value of the ring decreases by about 8% each year.

a) Write an equation that will predict the value of the ring *y* after *x* number of years. _____

b) What was the value of the ring 12 years ago? _____

c) After about how many years was the value around $400? _____

d) What is the value of the ring today? _____

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6) A construction company purchased a piece of equipment for $250,000. The value of the equipment depreciates at a rate of 12% each year.

a) Write an exponential decay model for the value of the piece of equipment. _____

b) What is the value of the equipment after 5 years? _____

c) Estimate when the equipment will have a value of $70,000. _____

Compounding Interest

7) You deposit $2,000 in an account that earns 5% annual interest. Find the balance after 1 year if the interest is compounded with the following frequency.

a) annually: _____

b) quarterly: _____

c) monthly: _____

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8) A customer purchases a television for $1000 using a credit card. The interest is charged on an unpaid balance at a rate of 18% per year compounded monthly. If the customer makes no payment for one year, how much is owed at the end of the year?

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9) You deposit $1000 in an account that earns 2.5% annual interest. Find the balance after 5 years if the interest compound with the following frequency.

a) biannually: _____

b) monthly: _____

c) daily: _____