WORKSHEET—EXPONENTIAL APPLICATIONS NAME _____

Interest compounded continuously $A = Pe^{rt}$ Growth/Decay $y = ae^{kt}$

Interest compounded frequently but not continuously $A = P\left(1+\frac{r}{n}\right)^{nt}$

t = # years
r = rate (make decimal)
n = # times compounded

Write an equation for each of the following. Then use your calculator to find the answer.

1. Thrifty Thelma invests $7500 in an account paying 4% interest compounded quarterly. How much will be in Thelma's account at the end of 6 years?

$A = 7500\left(1+\frac{.04}{4}\right)^{4(6)}$

$A = \$9523.01$

2. Sam the Saver invests $500 in an account that pays 3.5% interest compounded continuously. How much money will Sam have after 3 years?

$A = 500e^{.035(3)}$

$= \$555.36$

3. If you invest $2100 in a savings account that pays 2.25% interest compounded monthly, how much money will you have at the end of one year?

$A = 2100\left(1+\frac{.0225}{12}\right)^{12(1)}$

$= \$2147.74$

4. Ted invested $675 in an account that pays 3.4% interest compounded continuously. How much will be in his account after 6 months?

$A = 675e^{.034(.5)}$

$= \$686.57$

5. Your parents just won the Mega Millions Lottery. Because they love you so much, they decide to give you some of their winnings; however, they don't want you to have the money until your 22nd birthday. So they invest $15,000 in a trust fund that pays $3\frac{5}{8}\%$ interest compounded continuously.

Assuming that you are 17 years old right now, how much money will you get when you are 22?

$A = 15{,}000e^{(.03625 \cdot 5)}$

$= \$17980.72$

6. After t years, the value of a car that costs \$20,000 when it was new is modeled by $V(t) = 20{,}000\left(\frac{3}{4}\right)^t$.

Determine the value of the car 3 years after it was purchased.

$V(3) = 20{,}000\left(\frac{3}{4}\right)^3$

$= 8437.5$

7. A certain bacteria grows at an exponential rate with constant value of k = .0324. If there are 50 bacterium in a dish at the beginning of the day, how many will there be at the end of the day, 8 hours later?

$A = 50e^{(.0324(8))}$

$A = 64.79$

$\rightarrow 64$ * can't have .79 of a bacteria

8. The population of a town increases according to the model $P(t) = 2500e^{0.0293t}$ where t is time in years and $t = 0$ corresponds to 1990. What will the population of the town be in 2010?
What was the population of the town in 1985?

$P(20) = 2500e^{.0293(20)}$ * 2010 - 1990 = 20

$= 4491.97$

4491 - can't have .97 of a person

$P(-5) = 2500e^{.0293(-5)}$

$= 2159.3$

= 2159 - can't have .3 of a person

Answers: 1. \$9523.01 2. \$555.36 3. \$2147.74 4. \$686.57