Integrated Math 3. Chapter 13. **Name:**_____

13.5 Natural Logs and Applications Day 2 Homework

Exponential Growth & Decay

1. Vanessa invested $2,500 into an account that will increase in value by 3.5% each year. Write an exponential function to model this situation, then find the value of the investment after 20 years.

$f(t) = 2500(1.035)^t$

$f(20) = \$4974.47$

2. The average price of a movie ticket in 1990 was $4.22. Since then, the price has increased by approximately 3.1% each year. Write an exponential function to model this situation, then find the price of a ticket in 2016.

$f(t) = 4.22(1.031)^t$

$f(26) = \$9.83$

3. A virus has infected 400 people in the town and is spreading to 25% more people each day. Write an exponential function to model this situation, then find the number of people that will be infected in 10 days.

$f(t) = 400(1.25)^t$

$f(10) = 3725.29$

≈ 3725 people

4. The population of a small town was 10,800 in 2002. Since then, the population has decreased at a rate of 2.5% each year. Write an exponential function to model the situation, then find the population of the town in 2020.

$f(t) = 10800(.9725)^t$

$f(18) = 6847.10$

≈ 6847 people

5. Manny bought a brand new car in 2012 for $28,750. If the car depreciates by 12% each year, write an exponential function to model the situation, then find the value of the car in 2018.

$f(t) = 28750(.88)^t$

$f(6) = \$13351.62$

Compound Interest

6. Anisha invested $8,000 in an account that earns 10% interest. How much money will she have in 15 years if the interest is compounded quarterly?

$A = 8000\left(1 + \frac{.10}{4}\right)^{4(15)}$

$= \$35,198.32$

7. Kevin borrowed $32,500 to purchase a new car. If the rate on the loan is 6% compounded annually, how much will he pay in total over the course of the 5 year loan?

$32500\left(1 + \frac{.06}{1}\right)^{1(5)}$

$= \$43,492.33$

8. Scott invested $1,600 into a retirement account that earns 2.4% interest compounded monthly. What will be the balance of the account after 30 years?

$A = 1600\left(1 + \frac{.024}{12}\right)^{12(30)}$

$= \$3294.73$

9. Kaylee used her graduation money to set up a savings account that earns 3.4% interest compounded weekly. If the original amount deposited was $500, how much interest will she have earned after 10 years?

$A = 500\left(1 + \frac{.034}{52}\right)^{52(10)}$

$= 674.87$

174.87

10. Mr. and Mrs. Rainer took out a $240,000 loan to purchase their home. If the interest rate on the loan is 1.2% compounded bimonthly, how much interest will they have paid after 30 years?

$A = 240,000\left(1 + \frac{.012}{24}\right)^{24(30)}$

$= \$343,968.11$

$\$103,968.11$