Math 3 Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
1-4 Solving Exponential Word Problems

RECALL:

In working with interest that is ***compounded continuously***, the same formula is always used.



* **A represents the amount of money after a certain amount of time**
* **P represents the principle or the amount of money you start with**
* **r represents the interest** **rate** **and is always represented as a decimal**
* **t represents the amount of time in years**

1. Growth of bacteria in food products causes a need to “time-date” some products (like milk) so that shoppers will buy the product and consume it before the number of bacteria grows too large and the product goes bad. Suppose that the formula represents the growth of bacteria in a food product. The variable t represents time in days and represents the number of bacteria. If the product cannot be eaten after the bacteria count reaches 4,000,000 how long will it take?

2. In a given year, the minimum wage was only $1.60 per hour. Use the exponential growth formula to predict when that minimum wage in the United States will reach 8.50 per hour if the rate of growth in the minimum wage is 3.9%.

3. Scientific research has shown that the risk of having a car accident increases exponentially as the concentration of alcohol in the blood increases. A formula that models the risk of an accident is the following: . In the formula, R represents the % of risk. [R will be given as a percent and should be used as a percent rather than a decimal in working the problem.] Find the blood alcohol concentration ( ) that corresponds to a 25% risk of a car accident.

4. Victor wants to buy a new car that costs $90,000. He has saved $20,000. Determine how many years it will take his $20,000 to grow to $90,000 at 6.25% interest compounded continuously.

 5. You deposit $1600 into a back account that pays 5% compounded annually. How long with it take until the deposit is worth twice as much?

6. You buy a new computer for $2100. The computer decreases by 40% annually. When will the computer have a value of $600?

7. The foundation of your house has about 1,200 termites grow at a rate of about 2.4% per day. How long until the number of termites triple?

8. You drink a beverage with 120 mg of caffeine. Each hour, the caffeine in your system decreases by about 12%. How long until you have 10 mg of caffeine left in your blood stream?