## Exponential Growth & Compound Interest (EGCI)



Choose between the formulas  $FV = P\left(1 + \frac{r}{n}\right)^{nt}$  or  $FV = Pe^{rt}$ . Then plug in the appropriate values and answer the question.

- 1) Jay invests \$1800 with a company that offers a return rate of 10%, compounded monthly. How much will Jay have in the investment after two years?
- 2) Marisha invests \$5475 in the same company as Jay (in problem #1). How long will she have to wait before her investment is worth \$8000?

3) A lab culture contained 100 bacteria at 8:00 am. The bacteria grow at a rate of 33% per hour. What time will it be when the bacteria population reaches 100,000? [Hint: Figure out how long it will take, then use that to figure out the time.]



4) Jill buys a \$1500 refrigerator from an appliance store that offers 18-month financing at 0% interest. However, in the fine print, Jill sees that if the entire refrigerator isn't paid off by the end of those 18 months, she will owe 12.9% interest on the entire price, compounded monthly from the beginning of the loan. How much <u>extra</u> would Jill have to pay if she was even one day late paying off the refrigerator?

5) The value of a smart phone decreases continuously at an annual rate of 70%. How long will I have to wait before my phone is worth only one tenth of what I originally paid for it?



6) The half-life of Isotope X is only 47 minutes. The evil Dr. Doofenshmirtz synthesizes 10
kg of Isotope X to power his DeathRay-inator, which requires one kg of Isotope X to
function. How long will Perry the Platypus have to distract Dr. Doofenhsmirtz so he can't fire the DeathRay-inator?

- Jamal and Kaia each invest in two different companies. Jamal invests in Company J, which pays 5% interest, compounded annually. Kaia invests in Company K, which pays 4.5% interest, compounded weekly.
  - a. If they each invest for five years, who will earn the most money?

b. How long would Kaia have to invest in Company K to have her investment worth what Jamal's 5-year investment was worth?