23. Suppose you deposit \$1000 in an account paying 2% annual interest, compounded continuously, how many years would it take for your account to be worth \$2000?

$$A = Pe^{rt}$$

$$2000 = 1000e^{.02t}$$

$$A = e^{.02t}$$

$$A = lne^{.02t}$$

$$ln = .02t$$

$$ln = .02t$$

$$ln = t$$

13.
$$3e^{-2x} - 5 = 4$$

$$3e^{-2x} = 9$$

$$e^{-2x} = 3$$

$$\ln e^{-2x} = \ln 3$$

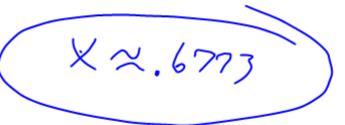
$$-2x = \ln 3$$

$$x = -\ln 3$$

$$x = -\ln 3$$

$$\ln(7x-4) = -0.3$$

$$e^{-.3} = 7x - 4$$
 $e^{-.3} + 4 = 7x$
 $\frac{(e^{-.3} + 4)}{7} = x$



Exponential Growth: $y = a(1+c)^{\pm}$ Exponential Decay: $y = a(1-c)^{\pm}$ $y = a(b)^{\times}$ $y = a(b)^{\times}$ $y = a(b)^{\times}$ $y = a(b)^{\times}$

Where $\mathcal Y$ is the amount of a quantity that exists/remains after t time periods given an initial amount $\mathcal A$ and $\mathcal F$ is the percent of increase/decrease expressed as a decimal.

2. In 1910, the population of a city was 120,000. Since then, the population has increased by 1.5% per year. If the population continues to grow at this rate, what will the population be in

2010?
$$y = a (1+r)^{t}$$

 $y = 120,000 (1+.015)^{100}$
 $y = 120,000 (1.015)^{100}$
 $y = 531,845$ people

1. A cup of coffee contains 130 milligrams of caffeine. If caffeine is eliminated from the body at a rate of 11% per hour, how long will it take for half of this caffeine to be eliminated?

eine
$$y=a(1-r)^{+}$$
t a

 $a = \frac{65}{130} = \frac{130(1-.11)^{+}}{130}$
 $a = \frac{130}{130} = \frac{130}{130}$
 $a = \frac{130}{130} = \frac{130}{130}$