

2. Given a logistic function with the following ordered pairs: (0, 10000), (10, 20000), & (20, 30000).

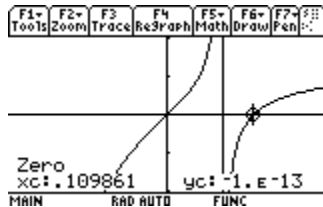
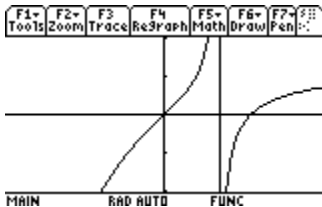
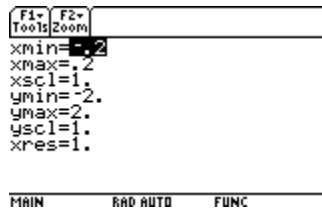
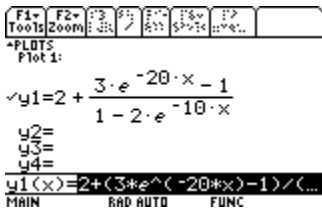
a) Find k.

$$10000 = \frac{L}{1+C} : L = 10000(1+C) = 10000 + 10000C : 20000 = \frac{L}{1+Ce^{-10k}} = \frac{10000 + 10000C}{1+Ce^{-10k}}$$

$$2 = \frac{1+C}{1+Ce^{-10k}} : 2 + 2Ce^{-10k} = 1 + C : 2Ce^{-10k} - C = -1 : C(2e^{-10k} - 1) = -1 : C = \frac{1}{1-2e^{-10k}} *$$

$$30000 = \frac{10000 + \frac{10000}{1-2e^{-10k}}}{1 + \left(\frac{1}{1-2e^{-10k}}\right)e^{-20k}} : 3 = \frac{1 + \frac{1}{1-2e^{-10k}}}{1 + \left(\frac{1}{1-2e^{-10k}}\right)e^{-20k}} : 3 + \frac{3e^{-20k}}{1-2e^{-10k}} = 1 + \frac{1}{1-2e^{-10k}}$$

$$2 + \frac{3e^{-20k} - 1}{1-2e^{-10k}} = 0 : \text{Graph the function using x for k and find the x-intercept.}$$



$$k = \boxed{0.10986}$$

b) Find C.

$$C = \frac{1}{1-2e^{-10k}} = \boxed{3}$$

c) Find L.

$$L = 10000(1+C) = 10000(1+3) = \boxed{40000}$$