Unit 10 Discussion Example – Post 1: Initial Thread

Population Models

- I live in King County, WA. I used the following website http://censusviewer.com/county/WA/King to find the current population: Year 2000 population is 1,737,081 and Year 2010 is 1,931,249

- My two ordered pairs would be (time, pop):

  (0, 1,737,081) and (10, 1,931,249)

Now, let's create the population model!

$P(t) = P_0 e^{kt}$ where P_0 is the initial population for $t = 0$

$P(t)$ is the population at time, t

k is the growth constant

- We'll using the initial population (0, 1,737,081) for P_o.

$P(t) = 1{,}737{,}081 * e^{kt}$

- Next we'll use the second ordered pair (10, 1,931,249) to find the growth constant

$$1{,}931{,}249 = 1{,}737{,}081 \times e^{k10}$$

$\frac{1{,}931{,}249}{1{,}737{,}081} = e^{k10}$ divide both sides by 1,737,081

$1.11178 = e^{k10}$

$\ln(1.11178) = \ln(e^{k10})$ take the natural log of both sides

$0.10596 = 10k$

$\frac{0.10596}{10} = k$ divide by 10 both sides

- k = 0.0106 That is our growth constant.
- Substituting the value of P_o and k in the original model, we get:

$$P(t) = 1{,}737{,}081 \times e^{0.0106\,t}$$