PC4-7

I can interpret a logistic growth model using a graphing utility.

1) The logistic growth model $P(t) = \frac{0.90}{1+3.5e^{-.339t}}$ relates the proportion of new personal computers sold at Best Buy that have Intel's latest coprocessor *t* months after it has been introduced.

a) What proportion of new personal computers sold at Best Buy will have Intel's latest coprocessor when it is first introduced (i.e., at *t=0*)?
b) Determine the maximum proportion of new personal computers sold at Best Buy that will have Intel's latest coprocessor.
c) Using a graphing utility, graph P(t).
d) When will 0.75 (75%) of new personal computers sold at Best Buy have Intel's latest coprocessor?

2) The logistic growth model

$$P(t) = \frac{0.8}{1+1.67e^{-0.16t}}$$

represents the proportion of new cars with a global positioning system (GPS). Let t = 0 represent 2006, t =1 represent 2007, and so on.

a) What proportion of cars in 2006 had a GPS?
b) Determine the maximum proportion of new cars that have a GPS
c) When will 75% of cars have a GPS? (calculator permitted)

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3) In a town whose population is 3500 people, a disease creates an epidemic. The number of people N infected *t* days after the disease has begun is given by the function

$$N(t) = \frac{3500}{1 + 18.9e^{-0.55t}}$$

a) How many people are initially infected with the disease (t = 0)?
b) When will half of the people in the town be infected?

4) Fruit flies are place in a half-pint milk bottle with a banana (for food) and yeast plants (for food and to provide a stimulus to lay eggs). Suppose the fruit fly population after t days is given by

$$P(t) = \frac{230}{1 + 56.5e^{-0.37t}}$$

a) Using a graphing utility, graph P(t).
b) What is the carrying capacity of the half-pint bottle? That is, what is P(t) as $t \to \infty$?
c) How many fruit flies were initially placed in the half-pint bottle?
d) When will the population of fruit flies be 180?

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