

* Do first ✓

Ex 2) Ten grizzly bears introduced to a nat'l park 10 yrs ago. 23 bears in park at present time. Park can support max of 100 bears. Assuming logistic growth, when will pop. reach 50, 75, 100?

$$P = \frac{M}{1 + Ae^{-kt}}$$

$$\begin{aligned} M &= 100 \\ P_0 &= 10 \\ P_{10} &= 23 \end{aligned}$$

$$10 = \frac{100}{1 + Ae^0}$$

$$23 = \frac{100}{1 + 9e^{-10k}}$$

$$10 = \frac{100}{1 + A}$$

$$1 + 9e^{-10k} = \frac{100}{23}$$

$$\begin{aligned} 10 + 10A &= 100 \\ 10A &= 90 \\ A &= 9 \end{aligned}$$

$$9e^{-10k} = \frac{77}{23}$$

$$e^{-10k} = 0.371981$$

$$P = \frac{100}{1 + 9e^{-kt}}$$

$$-10k = -0.988913$$

$$k = 0.0988913$$

$$P = \frac{100}{1 + 9e^{-0.099t}}$$

GRAPH :

$y = 50$ @ 22 yrs
 $y = 75$ @ 33 yrs
 $y = 100$ @ 75 yrs