3.2

#14 Let $P = P(t)$ = pop. at time t

$$\frac{dP}{dt} = kP$$

1980 $(t=0)$ was 1500.

2006 $(t=26)$ pop. was 6000

want estimate of pop. when $t=40$ (2020)

$$\frac{dP}{dt} = kP \quad \text{, separable}$$

$$\frac{1}{P}\,dP = k\,dt$$

$$\ln P = kt + C_1$$

$$P = C_2 e^{kt}, \quad C_2 = e^{C_1} > 0$$

when $t=0$, $P=1500$ $\therefore 1500 = C_2$

$$P = 1500\, e^{kt} \quad \text{and}$$

when $t=26$, $P=6000$

#14 $6000 = 1500 e^{26K}$

$4 = e^{26K}$

$\ln 4 = 26K \Rightarrow K = \frac{\ln 4}{26} \approx 0.05331901 39$

sto → K

So @ $t = 40$

$P = 1500 e^{40K} \approx 12657.19292$

≈ 12657 gators