

(1) Solve  $4.3(1.4)^t = 62.1$  for  $t$ .

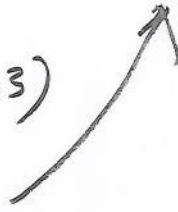
1 pt

$$(1.4)^t = \frac{62.1}{4.3}$$

$$t = \underline{7.93566..}$$

$$t \ln(1.4) = \ln(62.1/4.3)$$

$$t = \frac{\ln(62.1/4.3)}{\ln(1.4)}$$



(2) If a population grows by the formula  $P(t) = 6.1(1.78)^t$  how long does it take to double?

2 pts

Solve

$$P(t) = 2P(0)$$

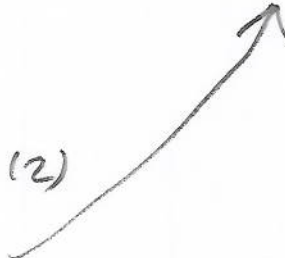
i.e.

$$6.1(1.78)^t = 2(6.1)$$

$$t \ln(1.78) = \ln(2)$$

$$t = \frac{\ln(2)}{\ln(1.78)}$$

$$\text{Doubling time} = \underline{1.226128..}$$



(3) A radio substance decays so that the amount left after  $t$  years is  $P_0 e^{-0.03t}$  where  $P_0$  is the initial amount. What is the half life?

2 pts

Solve

$$P(t) = \frac{1}{2} P(0)$$

i.e.

$$P_0 e^{-0.03t} = \frac{1}{2} P_0$$

$$e^{-0.03t} = \frac{1}{2} = 0.5$$

$$\ln(e^{-0.03t}) = \ln(0.5)$$

$$-0.03t = \ln(0.5)$$

$$t = \frac{\ln(0.5)}{-0.03}$$

$$\text{Half life} = \underline{23.1049..}$$

