Answer Key · Lesson 7.4: Logistic Functions

School Launch · Algebra II · Unit 7 · Worksheet A · for the parent

Key

1. 3900; 144; 369

A population follows $P(t) = \frac{3900}{1+26e^{-0.2t}}$. Give the carrying capacity, the initial population (nearest whole), and $P(5)$ (nearest whole).

2. 3300; 150; 992

A population follows $P(t) = \frac{3300}{1+21e^{-0.2t}}$. Give the carrying capacity, the initial population (nearest whole), and $P(11)$ (nearest whole).

3. 1300; 217; 997

A population follows $P(t) = \frac{1300}{1+5e^{-0.2t}}$. Give the carrying capacity, the initial population (nearest whole), and $P(14)$ (nearest whole).

4. 3600; 116; 3445

1. $P(0) = \dfrac{3600}{1+30} = \dfrac{3600}{31} \approx 116.1$
2. $P(13) = \dfrac{3600}{1+30e^{-0.5(13)}} = \dfrac{3600}{1+30(0.0015)} \approx 3444.6$

A population follows $P(t) = \frac{3600}{1+30e^{-0.5t}}$. Give the carrying capacity, the initial population (nearest whole), and $P(13)$ (nearest whole).

5. 1900; 158; 1581

1. $P(0) = \dfrac{1900}{1+11} = \dfrac{1900}{12} \approx 158.3$
2. $P(8) = \dfrac{1900}{1+11e^{-0.5(8)}} = \dfrac{1900}{1+11(0.0183)} \approx 1581.4$

A population follows $P(t) = \frac{1900}{1+11e^{-0.5t}}$. Give the carrying capacity, the initial population (nearest whole), and $P(8)$ (nearest whole).

6. 4300; 860; 3459

1. $P(0) = \dfrac{4300}{1+4} = \dfrac{4300}{5} \approx 860.0$
2. $P(14) = \dfrac{4300}{1+4e^{-0.2(14)}} = \dfrac{4300}{1+4(0.0608)} \approx 3458.7$

A population follows $P(t) = \frac{4300}{1+4e^{-0.2t}}$. Give the carrying capacity, the initial population (nearest whole), and $P(14)$ (nearest whole).

7. 2200; 314; 784

1. $P(0) = \dfrac{2200}{1+6} = \dfrac{2200}{7} \approx 314.3$
2. $P(4) = \dfrac{2200}{1+6e^{-0.3(4)}} = \dfrac{2200}{1+6(0.3012)} \approx 783.7$

A population follows $P(t) = \frac{2200}{1+6e^{-0.3t}}$. Give the carrying capacity, the initial population (nearest whole), and $P(4)$ (nearest whole).

8. 1900; 70; 970

1. $P(0) = \dfrac{1900}{1+26} = \dfrac{1900}{27} \approx 70.4$
2. $P(11) = \dfrac{1900}{1+26e^{-0.3(11)}} = \dfrac{1900}{1+26(0.0369)} \approx 969.9$

A population follows $P(t) = \frac{1900}{1+26e^{-0.3t}}$. Give the carrying capacity, the initial population (nearest whole), and $P(11)$ (nearest whole).

9. 4200; 247; 298

1. $P(0) = \dfrac{4200}{1+16} = \dfrac{4200}{17} \approx 247.1$
2. $P(1) = \dfrac{4200}{1+16e^{-0.2(1)}} = \dfrac{4200}{1+16(0.8187)} \approx 297.9$

A population follows $P(t) = \frac{4200}{1+16e^{-0.2t}}$. Give the carrying capacity, the initial population (nearest whole), and $P(1)$ (nearest whole).

10. 3600; 514; 2638

1. $P(0) = \dfrac{3600}{1+6} = \dfrac{3600}{7} \approx 514.3$
2. $P(14) = \dfrac{3600}{1+6e^{-0.2(14)}} = \dfrac{3600}{1+6(0.0608)} \approx 2637.6$

A population follows $P(t) = \frac{3600}{1+6e^{-0.2t}}$. Give the carrying capacity, the initial population (nearest whole), and $P(14)$ (nearest whole).