

Practice With Exponential Growth & Decay (2.9)

1. Determine whether each of the following represents an exponential growth function or exponential decay function, and find the constant percentage rate of growth or decay.



a. $P(t) = 3.5 \cdot 1.09^t$
growth / decay & r = _____

b. $P(t) = 4.3 \cdot 1.018^t$
growth / decay & r = _____

c. $f(x) = 78,963 \cdot 0.968^x$
growth / decay & r = _____

d. $f(x) = 5607 \cdot 0.9968^x$
growth / decay & r = _____

e. $g(t) = 247 \cdot 2^t$
growth / decay & r = _____

f. $g(t) = 43 \cdot 0.05^t$
growth / decay & r = _____

2. Determine the exponential function that satisfies the given conditions:



a. Initial value = 5, increasing at a rate of 1.7% per year

b. Initial value = 52, decreasing at a rate of 2.3% per day

c. Initial mass = 0.6 g, doubling every 3 days

d. Initial population = 250, halving every 7.5 hours

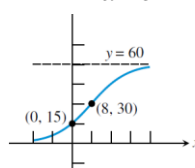
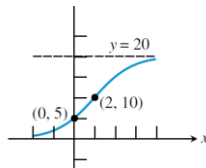
3. Find a logistic function of the form: $f(x) = \frac{c}{1 + a \cdot b^x}$ satisfying the following conditions: *****No Calculator*****



a. Initial value = 10
limit to growth = 40
passing through (1, 20)

b. Initial value = 12
limit to growth = 60
passing through (1, 24)

4. Determine a formula for the logistic function of the form: $f(x) = \frac{c}{1 + a \cdot b^x}$ whose graph is shown in the figure below.



a. _____

b. _____

5. The number of students infected with the swine flu at HSHS after t days is modeled by the function $f(t) = \frac{800}{1 + 49 \cdot e^{-0.2t}}$



a. How many students were sick when the outbreak started? _____



b. When will the number of infected students be 200? _____



c. What is the maximum number of students that could be infected? _____

6. The number of stray cats in town t days after an accident involving a truck hauling raw fish, is modeled by $f(t) = \frac{308}{1 + 27 \cdot 0.79^t}$



a. How many stray cats were in town before the accident? _____



b. When will the number of stray cats be 200? _____



c. What is the maximum number of stray cats that could survive in town? _____

7. Suppose that an experimental population of fruit flies increases exponentially. The population began with 100, & after 2 days the population reached 300 flies.



a. Write a model, $P(t)$, to represent the situation: _____



b. How many flies will be present in 10 days? _____



c. How long will it take for the population to reach a billion? _____

