3.5 Day 2 WS

HPC

Name:_____

Find an exponential function having the given values.

a. f(0) = 5, f(3) = 40

$$Y = ab^{x}$$

 $40 = 5(b)^{3}$
 $8 = b^{3}$
 $Y = 5(2)^{x}$

b. f(3) = 16, f(6) = 128

$$y = ab^{4}$$
 $2\theta = ab^{6}$
 $b = 2$
 $y = ab^{3}$
 $b = 2$
 $y = 2(2)^{2}$

- 2. A colony of bacteria decays so that the population t days from now is given by $(t) = 1000 \left(\frac{1}{2}\right)^{\frac{t}{4}}$.
 - a. What is the amount present when t = 0? | loop bacteria
 - b. How much will be present in 4 days? 1000 (1) 4/4 = 500 bacteria
 - c. What is the half-life? 4 days
- 3. The table shows the amount A(t) in grams of a radioactive element present after t days. Suppose that A(t) decays exponentially.

t days	0	2	4	6	8	10
A(t)	320	226	160	115	80	57

a. What is the half-life of the element?

4 days

- b. About how much will be present after 16 days? 320(2) 16/4 = 20 9
- **c**. Find an equation for A(t).

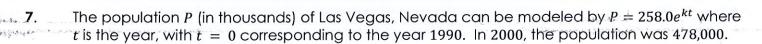
A4 320 (1) 4/4

5. An amount A_0 of a radioactive iodine has a half-life of 8.1 days. In terms of A_0 , how much is present after 5 days?

. 65 Ao

6. In a research experiment, a population of fruit flies is increasing according to the law of exponential growth. After 2 days, there are 125 flies, and after 4 days, there are 350 flies. How many flies will be there after 6 days? Round down to the nearest whole number.

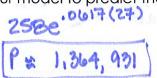
$$(2,125)$$
 (4,
350=ab⁴
125=ab²
 $H = b^2$



Find the value of k for the model. Round your result to four decimal places. a.

$$478,000 = 2580000e^{10k}$$
 In $\left(\frac{478000}{25800}\right) = k$

Use your model to predict the population in 2017.



The population of the world in 2000 was 6.1 billion, and the estimated relative growth rate was 8. 1.4% per year. If the population continues to grow at this rate, when will it reach 122 billion? Use $y = ae^{bt}$

$$122 = 6.1 e.014t$$

$$\frac{122}{6.1} = e.014t$$

9. A culture starts with 10000 bacteria and the number doubles every 40 minutes.

In the half-life formula, use a 2 instead of $\frac{1}{2}$ to find a function that models the number a. of bacteria at time t.

10000 (2) 60/40 = 28284 Find the number of bacteria after 1 hour. b.

After how many minutes will there be 50000 bacteria? a.

$$50000 = 10000 (2)^{t/40}$$
 $5 = 2^{t/40}$
 $1095 = \frac{1}{40} \log 2$
 $1 = 92.88 \min$

A culture starts with 8600 bacteria. After 1 hour, the count is 10000 10.

Find a function that models the number of bacteria after t hours. Use $y = ae^{bt}$ a.

b.

After how many minutes will the number of bacteria double? C.

$$17200 = 8600e$$
. ISO8t
 $2 = e^{1508t}$
 $\frac{1112}{1500} = t$ $\frac{1}{2}$ 4.60 hours