Exponential Growth and Decay Problems | Lesson 4.5 Day 3

Answer the following questions that deal with the doubling concept. Recall that the formula $y = Ca^x$ which can now be rewritten as $y = C(2)^{\frac{t}{D}}$. In these two formulas, recall what the variables really mean:

$y = Ca^x$	$y = C(2)^{\frac{t}{D}}$
y ➔ amount after/at …..	y ➔ amount after/at …..
C ➔ initial amount	C ➔ initial amount
a ➔	t ➔ time
x ➔	D ➔ Time it takes to double

1. A dish has 212 bacteria in it. The population of bacteria will double every 2 days. How many bacteria will be present in . . .

   a) 8 days b) 11 days c) 4 hours d) 2 months

2. An experiment starts off with *X* bacteria. This population of bacteria will double every 7 days and grows to 11,888 in 32 days. How many bacteria where present at the start of the experiment?

3. A bacteria culture grows according to the formula: $y = 12000(2)^{\frac{t}{4}}$ where t is in hours. How many bacteria are present:
   (a) at the beginning of the experiment?
   (b) after 12 hours?
   (c) after 19 days?
   (d) What is the doubling time of the bacteria?

4. A bacteria culture starts with 3000 bacteria. After 3 hours there are 48 000 bacteria present. What is the length of the doubling period?

5. Mr S. makes an initial investment of $15,000. This initial investment will double every 9 years. What is the value of this investment in . . .

   a) 20 years b) 6 years c) What is the yearly rate of increase of this investment?

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Answer the following questions that deal with the doubling concept. Recall that the formula $y = Ca^x$ which can now be rewritten as $y = C\left(\frac{1}{2}\right)^{\frac{t}{H}}$. In these two formulas, recall what the variables really mean:

$y = Ca^x$	$y = C\left(\frac{1}{2}\right)^{\frac{t}{H}}$
y ➔ amount after/at …..	y ➔ amount after/at …..
C ➔ initial amount	C ➔ initial amount
a ➔	t ➔ time
x ➔	H ➔ half life

6. Iodine-131 is a radioactive isotope of iodine that has a half-life of 8 days. A science lab initially has 200 grams of iodine-131. How much iodine-131 will be present in . . .

   a) 8 days b) 20 days c) 1 year d) 2 months

7. A medical experiment starts off with *X* grams of a radioactive chemical called Mathematus. This chemical will decay in half every 15 seconds and in the course of the experiment, will decay to 9.765 g in 2 minutes. How much Mathematus was present at the start of the experiment?

8. A chemical decays according to the formula: $y = 12000\left(\frac{1}{2}\right)^{\frac{t}{25}}$ where t is in time in hours and y is amount of chemical left, measured in grams. What amount of chemical is present:

   (e) at the beginning of the experiment?
   (f) after 100 hours?
   (g) after 19 days?
   (h) What is the half-life of the chemical?

9. A block of dry ice is losing its mass at a rate of 12.5% per hour. At 1 PM it weighed 50 pounds. What was its weight at 5 PM? What was the approximate half-life of the block of dry ice under these conditions?