Functions & Trig. Name _____
Exponential Growth/Decay

1.) The population of a town **increases** from 15,000 at an annual rate of 2% per year.

Write a model that describes the population of the town.

$y = a(b)^x$

$y = a(1+r)^x$

$y = 15{,}000(1.02)^x$

2.) The population of a town **decreases** from 10,000 at an annual rate of 2% per year.

Write a model that describes the population of the town.

$y = a(b)^x$

$y = a(1-r)^x$

$y = 10{,}000(.98)^x$

3.) The number of carbon atoms in a fossil is given by the function, $y = 5100(0.95)^x$, where x represents the number of years since being discovered.

a. Is this a **growth** or **decay** model?

decay

b. What is the percent of change each year?

$1 - r = .95$

$r = .05$

5%

4.) Pedro and Bobby each own an ant farm. Pedro starts with 100 ants and says his farm is growing exponentially at a rate of 15% per month. Bobby starts with 350 ants and says his farm is steadily decreasing by 5 ants per month.

Assuming both boys are accurate in describing the population of their ant farms, after how many months will they both have approximately the same number of ants?

(A) 7 (B) 8 (C) 13 (D) 36

Pedro

$y = a(1+r)^x$

$y = 100(1.15)^x$

Bobby

Linear: $y = mx + b$

$y = -5x + 350$

Intersection

(8.09, 309.57)

5.) A house purchased 5 years ago for $100,000 was just sold for $135,000.

x a y

Assuming exponential growth, approximate the annual growth rate, ***to the nearest percent***.

$y = a(1+r)^x$

$\frac{135,000}{100,000} = \frac{100,000(1+r)^5}{100,000}$

$\sqrt[5]{1.35} = \sqrt[5]{(1+r)^5}$

$1.06 = 1 + r$

$.06 = r$

6%