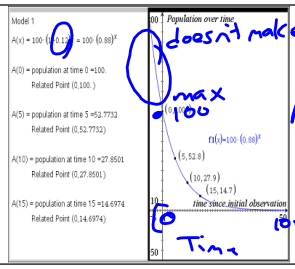
Goal 1: Do recognize the type of model that is present?
Goal 2: Can you determine the rate of change as a decimal?
Goal 3: Can you determine the rate of change as a percent?
Goal 4: Can you complete a table related to the population over time?
Goal 5: Do you know the initial population from the model?
Goal 6: Can you connect the graph of the model to its function?
Goal 7: Can you label points from a table on the graph of a model? (including its initial point)



doesn't make sense

$A = P(1+r)^t$

For model 1

What type of model is present? Decay growth or decay

What is the rate of change as a decimal? -.12 What is the rate of change as a percentage? -12 %

Base = 0.88

Solve for r: $1 + r = 0.88$, $-1 \quad -1$, $r = -0.12$

What was the initial population? 100

What does the point (15, 14.7) mean? The 15 tells us time while the 14.7 tells us population

(the unit of time was not specifically mentioned but it can be seconds, minutes, hours, decades, etc. it just depends on scenario and population we are observing)

The domain of this model is [0,100) The range of population in this model is (0,100] we technically can never reach 0)

x values y values

min max

"Other" Questions that you might be asked to do when given the model, like this scenario

1. Complete the table related to the given model (Remember 2nd Graph makes a table with TI 84) $Y = 100(0.88)^x$

X	0	1	2	3	4	5	6
A(x)	100	88	77	68	59	52.	46

77.44 68.14 59.96

Round down

2. When does this population reach ½ of its initial population?

   Initial $\frac{1}{2}$ of 100 is 50

   1. This simply asking you to:
      1. know that ½ of the initial population is 50 = A
      2. solve the equation $50 = 100(0.88)^x$

         Solve for exponent: $\frac{50}{100} = \frac{100}{100}$, $.5 = .88^x$

         $\log_{.88}(0.5) = x$

         $\frac{\log(0.5)}{\log(0.88)} = x$

3. When does this population fall below 75? = A

   Interval

   1. This simply asking you to:
      1. solve the equation $75 = 100(0.88)^x$

         $\frac{75}{100} = \frac{100}{100}$, $0.75 = 0.88^x$

         $\log_{.88}(.75) = x$

         $\frac{\log(0.75)}{\log(0.88)} = x$

      2. state the INFINITELY many solutions using a set notation or inequality

         $2.25 < x$

         $x \in (2.25, \infty)$

4. When does this population exceed 16?

   1. This simply asking you to:
      1. solve the equation $16 = 100(0.88)^x$

         $\frac{16}{100} = \frac{100}{100}$, $0.16 = 0.88^x$

         $\log 0.16 = \log(.88)^x$

         $\log 0.16 = x \cdot \log(.88)$

         $\frac{\log 0.16}{\log 0.88} = x$

      2. state the INFINITELY many solutions using a set notation or inequality

         $0 < x < 14.336$

         $x \in [0, 14.336)$

$1+r$

$1+0.25 = 1+r$

$-1 \quad -1$

$0.25 = r$

Practice for you

1. Given model $A(x) = 200(1.25)^x$

What type of model is present? _____ growth or decay

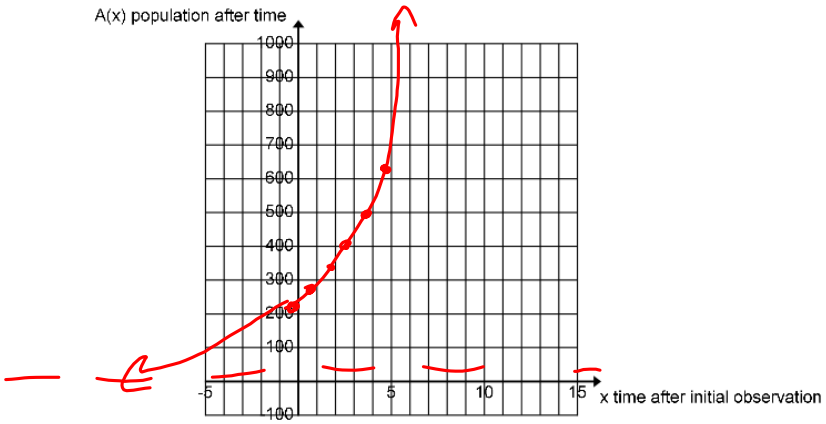
What is the rate of change as a decimal? 0.25 What is the rate of change as a percentage? 25 %

What was the initial population? 200

Complete the table related to the given model (Remember 2nd Graph makes a table with TI 84 or just plug in these x values into the function on any calculator)

X	0	1	2	3	4	5	6
A(x)	200	250	312.5	390.63	488.28	610.35	762.94

Sketch a graph of A(x) label at least three points ONE POINT MUST be the y intercept



$A = P(1+0.25)^t$

2. When does this population reach DOUBLE its initial population?

$t = ?$

$\frac{400}{200} = \frac{200(1.25)^t}{200}$

3. When does this population fall below 400?

$t \in [0, 3.106)$

4. When does this population exceed 525?

$t \in (3.664, \infty)$

$2 = 1.25^t$

Method 2

$\log_{1.25}(2) = \log_{1.25}(1.25^t)$

$\frac{\log(2)}{\log(1.25)} = t$

$t = 3.106$

$\frac{525}{200} = \frac{200(1.25)^t}{200}$

$2.625 = 1.25^t$

exponents

base

$\log_{1.25}(2.625) = t$

base

exponents

$\frac{\log(2.625)}{\log(1.25)} = t = 3.664$

Practice for you $1+r=4$, $r=3$ positive

5. Given model $A(x) = 50(4)^x$

What type of model is present? growth growth or decay

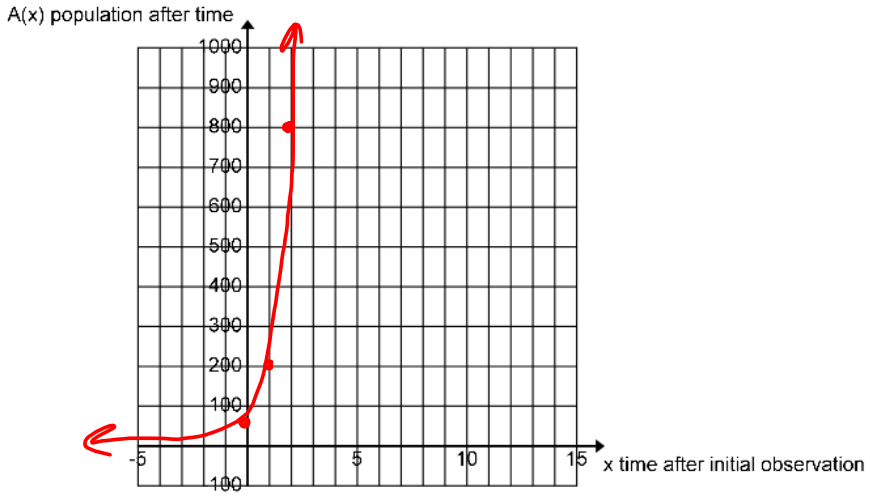
What is the rate of change as a decimal? 3 What is the rate of change as a percentage? 300%

What was the initial population? 50

Complete the table related to the given model (Remember 2nd Graph makes a table with TI 84 or just plug in these x values into the function on any calculator)

X	0	1	2	3	4	5	6
A(x)	50	200	800	3200	12800	51200	204800

Sketch a graph of A(x) label at least three points ONE POINT MUST be the y intercept



6. When does this population reach TRIPLE its initial population?

$50 \cdot 3$ $\frac{150}{50} = \frac{50(4)^x}{50}$ $3 = 4^x$ $\log_4(3) = x$ $x = 0.792$

7. When does this population fall below 150?

$x \in [0, 0.792)$

8. When does this population exceed 25?

$25 = 50(4)^x$ $0.5 = 4^x$ $\log_4(0.5) = x$ $x = -.5$

The entire time it starts bigger than 25 at 50 and grows.