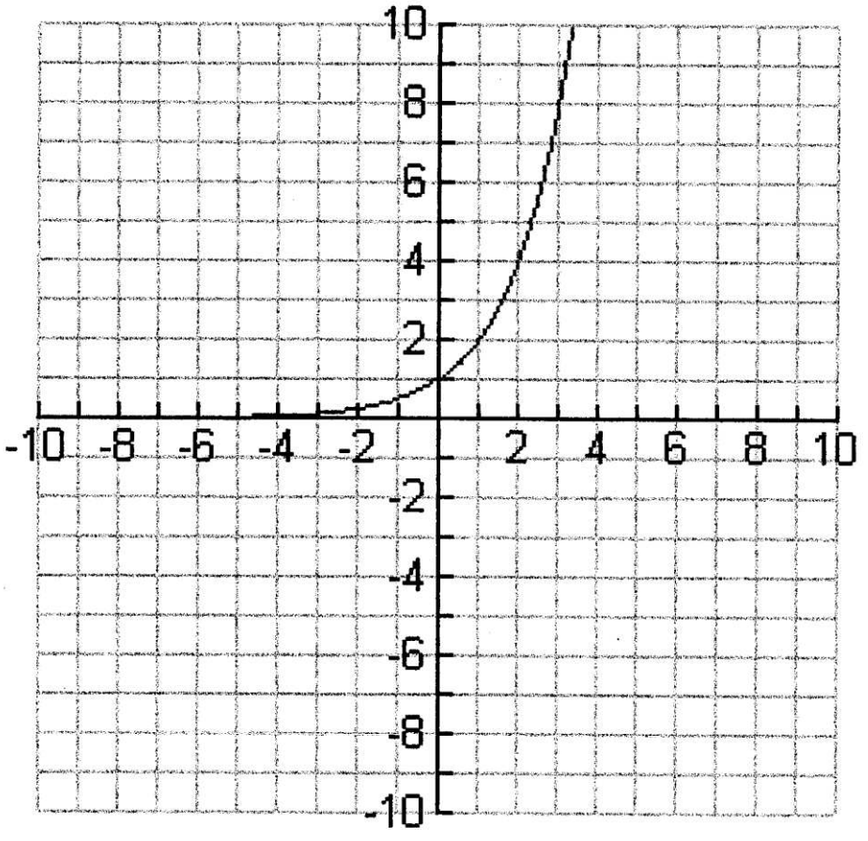
Acquisition Lesson Planning Form
Plan for the Concept, Topic, or Skill – Applying the Properties of Logarithms and Exponential Functions
Key Standards addressed in this Lesson: MM3A2d,g
Time allotted for this Lesson:

Standard: MM3A2d,g: Students will explore logarithmic functions as inverses of exponential functions. d. Understand and use properties of logarithms by extending laws of exponents. g. Explore real phenomena related to exponential and logarithmic functions including half – life and doubling life.
Essential Question: How do properties of logarithms and laws of exponents relate to real phenomena?
Activating Strategies: Give your students a list of log and exponential problems to simplify for review. $5^{\log_5 3}$ $\log_4 8$ $4^{\sqrt{2}} * 4^{\sqrt{2}}$ $\log_6 6^2$ $(x^{\sqrt{3}})^{\sqrt{3}}$
Acceleration/Previewing: (Key Vocabulary) Logarithms, exponents, half – life, appreciation, depreciation, common logarithm, exponential functions, logarithmic functions
Teaching Strategies: Use the folding activity, Paper folding with Exponential and Logarithmic Functions, to help reinforce the concept that logs and exponential functions are inverse functions. Use Graphic Organizer to demonstrate how to solve exponential equations. Demonstrate how to use the properties of logs to solve log equations. Use the Graphic Organizer (flowers) to introduce the real phenomena equations for solving equations involving logs and exponentials. Work a few problems together as a class.
Task: Investigating the Properties of Logarithms Potato Lab Historical Background
Distributed Guided Practice: Exponential Real Word Problems Worksheet (individually or in pairs) Can find extra worksheets at www.kutasoftware.com
Extending/Refining Strategies: Potato Lab Task
Summarizing Strategies: Journal: How are logarithmic and exponential functions relate? How do you solve logarithmic and exponential functions?

Paperfolding with Exponential and Logarithmic Functions



1. Graph the line $y = x$.

2. Fold your paper on the line $y = x$.

3. Trace the resulting curve on the outside and then on the inside of the paper.

4. What is special about lines that are reflections over the line $y = x$?

5. What is the equation of the original graph?

6. In a table, start listing the domains, ranges, asymptotes, intercepts, and direction for both curves.

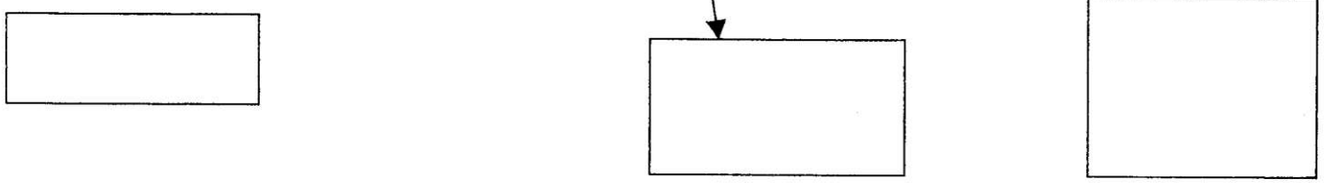
How do you solve exponential equations?

???

	Example	Your Turn
	$3^{x-1}=27^{x}$	
Write each side with the same base. →		
Simplify the exponents. →		
Put the exponents equal each other and solve. →		

Graphic Organizer by Dale Graham and Linda Meyer
Thomas County Central High School; Thomasville GA

$\log_5 625 = 4$

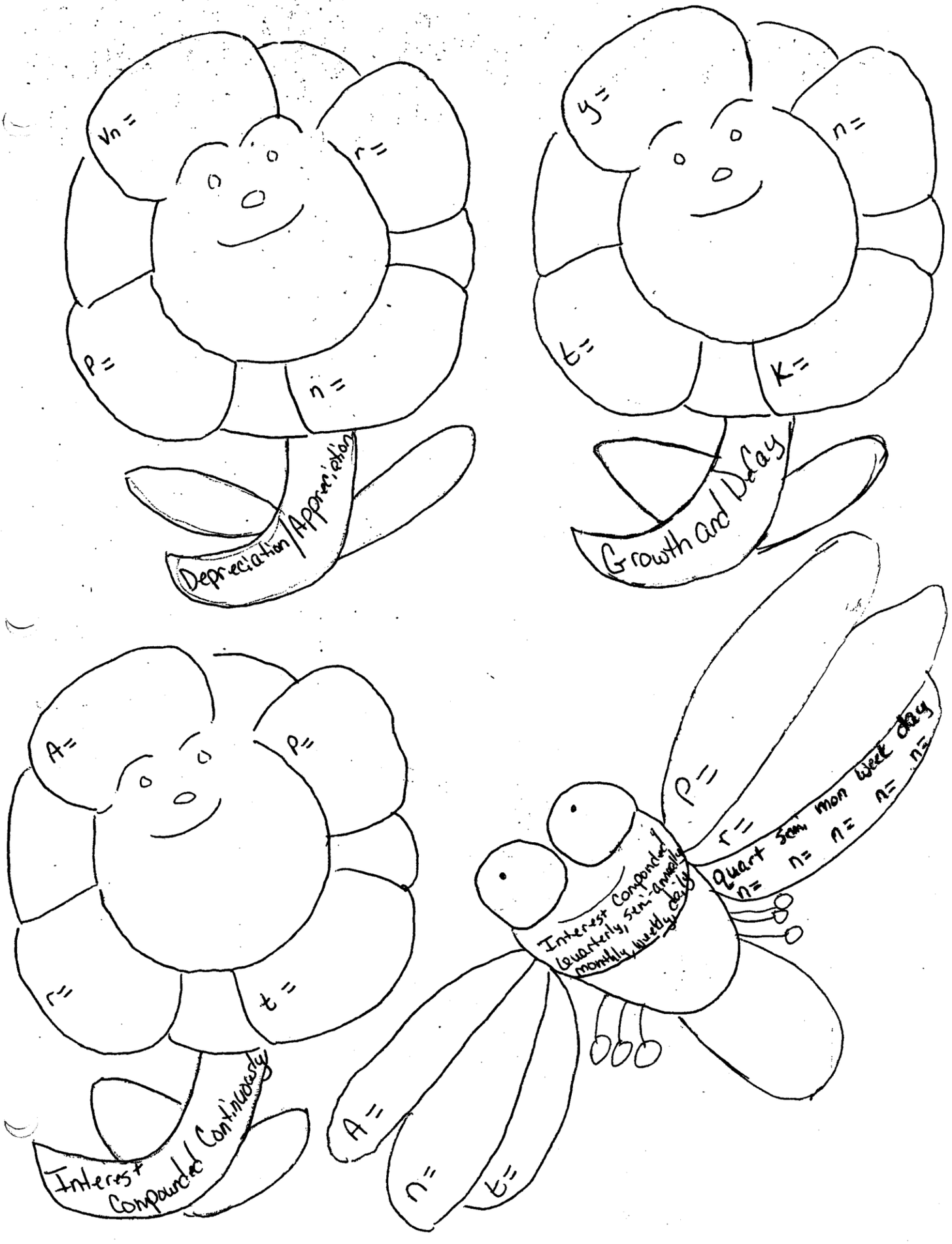


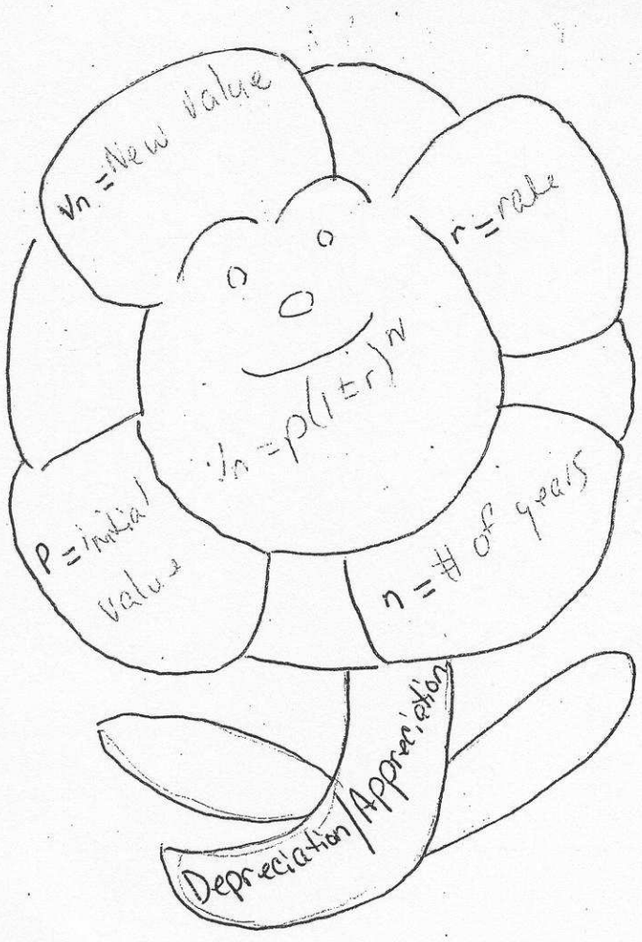
$4^3 = 64$ →

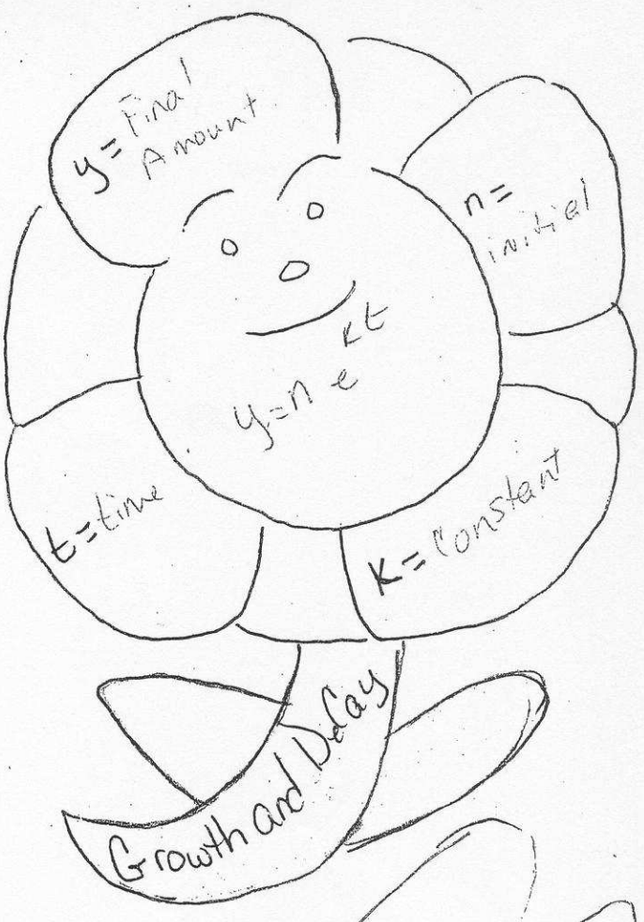
Shortcut Rule

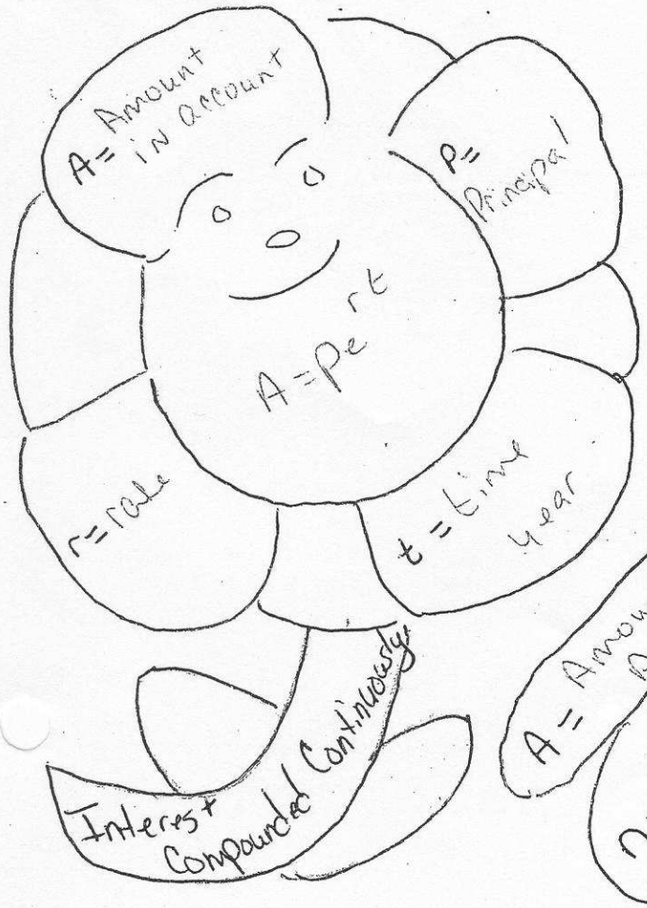
Log Equations

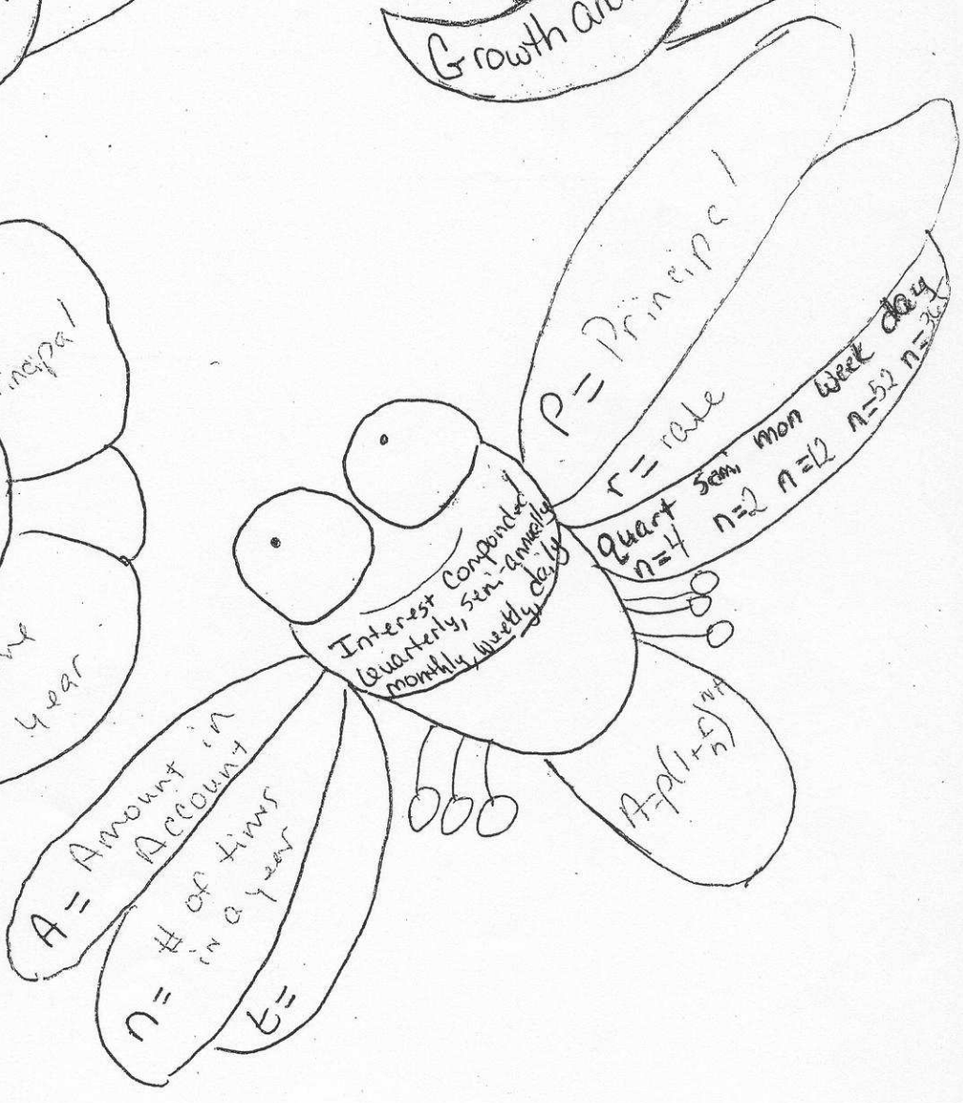
Log Rules


Vn =
r =
P =
n =
Depreciation/Appreciation
y =
n =
t =
K =
Growth and Decay
A =
P =
r =
t =
Interest Compounded Continuously
P =
r =
Quart Sem mon week day
n = n = n = n = n =
Interest Compounded
Quarterly, semi-annually
monthly, weekly, daily
A =
n =
t =


Vn = New value
r = rate
Vn = p(1±r)^n
P = initial value
n = # of years
Depreciation/Appreciation


y = Final Amount
n = initial
y = n e^kt
t = time
K = Constant
Growth and Decay


A = Amount in account
P = Principal
A = Pe^rt
r = rate
t = time year
Interest Compounded Continuously


P = Principal
r = rate
Quart Semi mon week day
n=4 n=2 n=12 n=52 n=365
Interest Compounded Quarterly, semi-annually monthly, weekly, daily
A = p(1+r/n)^nt
A = Amount in Account
n = # of times in a year
t =

Exponential Real World Problems

Name: _____ Date: _____

1. Joan invested $1000 3 years ago. It is now worth $1276. If interest is compounded continuously, what is the interest rate?

2. For a certain strain of bacteria, k is .775 when t is measured in hours. How long will it take 2 bacteria to increase to 1000?

3. Dave bought a car 8 years ago for $5400. To buy a similar car today would cost $12,500. Assuming a steady rate of increase, what was the yearly rate of inflation?

4. Jack deposited $100 in an account that pays 6% interest compounded continuously. When he withdrew the money, there was a balance of $200. How long ago did he open the account?

5. A strain of bacteria can grow from 3 to 15 in 3 hours. What is the value of k?

6. A $50 baseball card is worth $400 in 5 year time. What is the rate of appreciation?

7. How much will $500 earn if invested for 6% compounded continuously for 5 years.

8. In 5 years, the mass of a 100 gram sample of an element is reduced to 75 grams. Find the value of k?`