AGENDA

Objective:SWBAT model and solve real-world problems involving exponential and logarithmic relationships

Language Objective: SWBAT answer reflection questions in writing in order to compare the graphs of exponential and logarithmic functions.

1) Take out HW to be checked/DO NOW
2) HW Questions
3) Log Apps

HW: "Logs worksheet #6"

Do Now Solve for x.

1. $10 + \log_4 25 = x$

2. $4 + 4^x = 14$

3. $2 \bullet log_3 x = \log_3(x-1) + \log_3 4$

4) You invest $350 of your babysitting money into a savings account that earns 1.2% annually. How many years will it be until you have enough money to go on a vacation that costs $600 (if you don't invest any more money into the account)?

Do Now Solve for x.

1. $10+\log_4 25 = x$

$10 + 2.32 = x$

$12.32 = x$

2. $4+4^x = 14$

$4^x = 10$

$\log_4(10) = x$

$1.66 = x$

3. $2 \bullet \log_3 x = \log_3(x-1)+\log_3 4$

$\log_3(x^2) = \log_3(4(x-1))$

$x^2 = 4x - 4$

$x^2 - 4x + 4 = 0$

$(x-2)(x-2)=0$

$x = 2$

4) You invest $350 of your babysitting money into a savings account that earns 1.2% annually. How many years will it be until you have enough money to go on a vacation that costs $600 (if you don't invest any more money into the account)?

$600 = 350(1+.012)^t$

$1.71 = (1.012)^t$

$\log_{1.012}(1.71) = t$

$44.98 = t \approx 45$ years

1) Application: Suppose the number of lilies on a pond keeps doubling every week. It would take about 5000 lilies to cover a small pond and there are 2 lilies on the pond on the first day. How many lilies will be on the pond in 9 weeks?	2) Equation
3) What are we solving for?	4) Solve

1) Application: Suppose the number of lilies on a pond keeps doubling every week. It would take about 5000 lilies to cover a small pond and there are 2 lilies on the pond on the first day. How many days will it take before the entire pond is covered?	2) Equation
3) What are we solving for?	4) Solve

1) Application:	2) Equation
Suppose the number of lilies on a pond keeps doubling every week. It would take about 5000 lilies to cover a small pond and there are 2 lilies on the pond on the first day. How many lilies will be on the pond in 9 weeks?	$A = 2(2)^9$
3) What are we solving for?	**4) Solve**
We are solving for the final Amount of lilies on the pond	$A = 1024$ lilies

1) Application:	2) Equation
Suppose the number of lilies on a pond keeps doubling every week. It would take about 5000 lilies to cover a small pond and there are 2 lilies on the pond on the first day. How many days will it take before the entire pond is covered?	$5000 = 2(2)^t$
3) What are we solving for?	**4) Solve**
We are solving for the number of days to reach 500 lilies	$2500 = (2)^t$ $\log_2(2500) = t$ $11.29 = t \approx 11$ days

1) Application: Suppose that a small country has a population of 10 million and an annual growth rate of 4.5%. How long will it take before the population doubles?	2) Equation
3) What are we solving for?	4) Solve

1) Application: A ball is dropped from a height of 25 feet and rises up two-thirds of that distance after its first bounce. Each succeeding height is two-thirds of the previous height. How many bounces must occur in order for the ball to bounce less than one foot from the ground?	2) Equation
3) What are we solving for?	4) Solve

1) Application:	2) Equation
The population of the United States was about 230 million in 1984. At an annual growth rate of 1.5%, how long, to the nearest tenth of a year, would it take for the population to grow 300 million?	
3) What are we solving for?	**4) Solve**

1) Application:	2) Equation
Assuming that the Native Americans really did sell Manhattan for the legendary $24, and further assuming that the sale took place exactly 388 years ago, how much money would the Native Americans now have if they had placed the money in a bank that paid 5% interest per year, compounded annually?	
3) What are we solving for?	**4) Solve**

1) Application: A particularly prolific microorganism has baffled all of modern science by dividing into 3 every hour. If there are 10 of these little bugs in a Petri dish at 9:00 one morning, how many will there be by 5:00 pm?	2) Equation
3) What are we solving for?	4) Solve

1) Application: A particularly prolific microorganism has baffled all of modern science by dividing into 3 every hour. If there are 10 of these little bugs in a Petri dish at 9:00 one morning, after how many hours will there be 100,000 bacteria?	2) Equation
3) What are we solving for?	4) Solve

HW: "Logs worksheet #6"

Name ____ Date __________

M 518 Logarithms Applications

1. Explain why or when you need to use logs.

2. Write the equation in exponential form $\log_4 \frac{1}{16} = -2$ ________________

3. Write the equation in logarithmic form. $x^t = z$ ____________________

4. Solve for x: (Do not need logs for this one…)

$$5^{4x} = 125^{x+6}$$

$x =$ __________

5. Solve each equation for x. If necessary, round your answer to the nearest hundredth.

a. $2 = \log_x 100$ _______________

b. $\log_{\frac{2}{3}} \frac{4}{9} = x$ _______________

c. $12^x = 500$ _______________

d. $8^{x+3} = 110$ _______________

6. Evaluate each expression.

a.* $\log_{12} 12^8 + \log_8 1$ ____________________

b. $\log_2 \sqrt{2}$ ____________

c. $7^{\log_7 45}$ _________________

d. $\log_2 \frac{1}{4}$ _______________

e. $\log_{15} 200$ _______________

HW: "Logs worksheet #6" continued...

7. a) Find the amount of a $3500 investment after 12 years at 5% interest compounded monthly. Round your answer to the nearest cent.

Compound Interest Formula: $A = P(1+\frac{r}{n})^{nt}$

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b) Find out **when** the amount will reach $4000. Round to nearest month. Must show work.

c) **When** will the amount double?

8. Bruce bought a car for $12,000. The salesperson projected that the value of the car would decline by 14.5% per year for the next 6 years.

a. Write an expression for the projected value of Bruce's car after n years.

b. Predict the value, to the nearest hundred dollars, of Bruce's car after 6 years.

c. Find out after how many years and months will the car be half ifs value.