Happy Introduce a Girl to Engineering Day!

- Park your phones
- Grab your calculators
- Start the warm up (on circle table)
- Take out HW

Compound Interest, Log Properties

Given
$$A(t) = 142e^{0.07t}$$

growth

Find the rate? 7%
Initial Value? 142

Given $A(t) = 42\left(1 + \left(\frac{.96}{4}\right)\right)^{4t}$ growth.

Find the rate? 96%

Initial Value? 42

Compound

Quarterly

Which formula and why? DO NOT SOLVE!

1. Ashleigh wants to double her money. She put \$5,000 in a bank account that pays 4% compounded continuously.

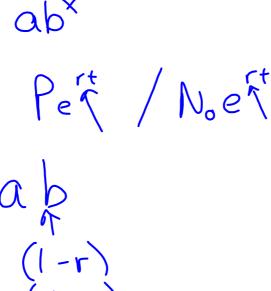
Pert

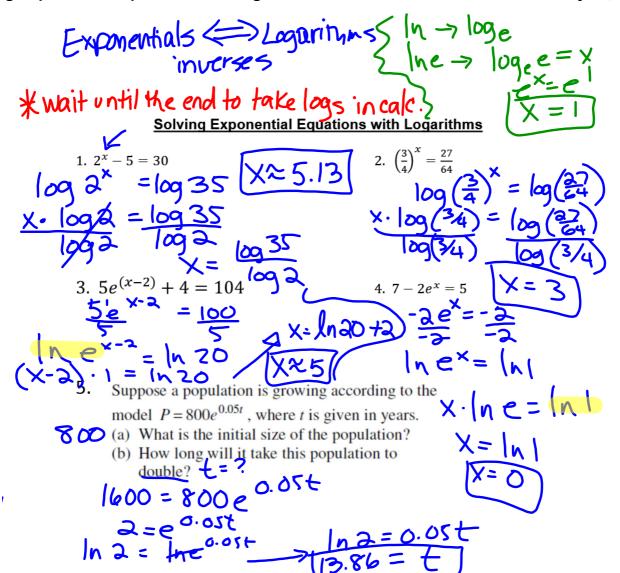
2. Martha makes an investment of \$500 in an account that pays 6% interest compounded monthly.

Compound interest

- 3. If the population of a country is growing at a rate of 2.2% compounded annually, how long will it take the population of 60,000 people to double?
- 4. The population of a certain species of fish has a relative growth rate of 1.2% per year. It is estimated that the population in the year 2000 was 12 million

 Find a bank account balance if the account starts with \$100, has an annual rate of 4%, and the money left in the account for 12 years





6. Find out how long it will take \$1500 to triple in value if it is invested at 12% interest, compounded quarterly.

$$A(t) = 1500(1 + (\frac{12}{4}))^{(4t)}$$

$$4500 = 1500(1 + .03)^{4t}$$

$$4500 = 1500(1.03)^{4t}$$

$$1500$$

$$3 = (1.03)^{4t}$$

$$1 = \frac{4t \cdot \ln 1.03}{4 \ln 1.03}$$

$$1 = \frac{4}{4 \ln 1.03}$$

$$1 = \frac{4}{4 \ln 1.03}$$

Solving Exponential Equations Using Logarithms

Use the properties of logarithms to solve the exponential equations.

1)
$$2^x = 45$$

2)
$$3^x = 3.6$$

2)
$$3^x = 3.6$$
 3) $10^{2y} = 52$

4)
$$7^{3y} = 126$$
 5) $3^{x+4} = 6$ 6) $10^{x+6} = 250$
 $109_{7}7^{3y} = 109_{7}126$
 $3y = 109_{7}126$

7)
$$3e^x = 42$$

8)
$$\frac{1}{4}e^x = 5$$

7)
$$3e^x = 42$$
 8) $\frac{1}{4}e^x = 5$ 9) $\frac{1}{2}e^{3x} = 20$

10)
$$250(1.04)^x = 1000$$
 11) $300e^{\frac{x}{2}} = 9000$ 12) $1000^{0.12x} = 25000$

12)
$$1000^{0.12x} = 25000$$

13)
$$\frac{1}{5}(4^{x+2}) = 300$$
 14) $6 + 2^{x-1} = 1$ 15) $7 + e^{2-x} = 28$

$$14) \quad 6 + 2^{x-1} = 1$$

15)
$$7 + e^{2-x} = 28$$

16)
$$8-12e^{-x}=7$$
 17) $4+e^{2x}=10$ 18) $32+e^{7x}=46$

17)
$$4 + e^{2x} = 10$$

18)
$$32 + e^{7x} = 46$$

$$19) \quad 23 - 5e^{x+1} = 3$$

19)
$$23-5e^{x+1}=3$$
 20) $4\left(1+e^{\frac{x}{3}}\right)=84$

23) The population P of a city is given by the function $P = 2500e^{kt}$, where t = 0 represents the year 1990. In 1945 the population was 1350. Find the value of k, and use this value to predict the population in the year 2010.

Solve each equation

$$24.\ 4^{1-2x}=2$$

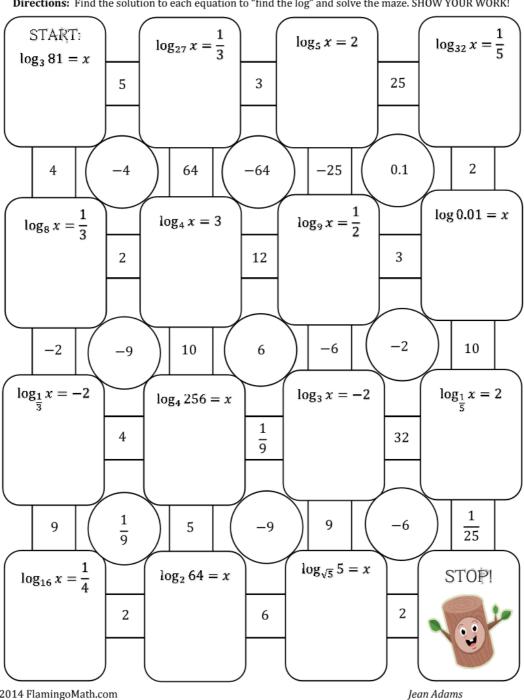
x. log 5 = (x+2) log 3 1.46X=X+2

27.
$$e^{1-x} = 5$$

$$\left(3^{-4}\right)^{-3} = 3^{-1}$$

Logarithmic Equations Maze

Directions: Find the solution to each equation to "find the log" and solve the maze. SHOW YOUR WORK!



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SNOW BALL FIGHT!

$$|00|_{5} = x$$

$$|5|_{2} = 5$$

$$|x=1|_{x=2} = 5$$

$$|5|_{2} = 5$$

$$|5|_{2} = 5$$

$$|5|_{2} = 5$$

$$|5|_{2} = 5$$