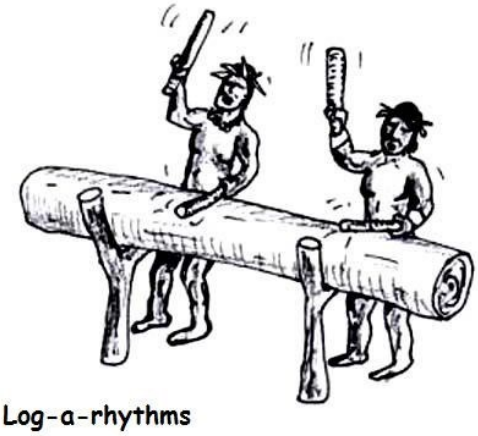
Name _____

Math 3 Unit 8: Exponentials and Logarithms



May 6 ● Solve log equations HW: 8.1	**May 7** ● Solve log equations with properties HW: 8.2	**May 8** ● Solve exponential equations HW: 8.3	**May 9** ● Solve exponential equations with binomial exponents HW: 8.4	**May 10** ● QUIZ!! ● Graph log and exponential functions HW: 8.5
May 13 ● Growth and decay HW: 8.6	**May 14** ● Compound Interest HW: 8.7	**May 15** ● More applications of exponential functions HW: 8.8	**May 16** ● Review for test HW: finish review	**May 17** ● TEST!!!

8.1 - Solve Logarithmic Equations

Solve for x.

1. $\log_3 x = 4$

2. $\log_4(2x + 10) = 3$

3. $\log_x 512 = 3$

4. $\log_6(4x + 9) = \log_6(2x + 19)$

5. $\log x = 4$

6. $\log_x 36 = 2$

7. $\log_3(3x - 6) = \log_3(2x + 1)$

8. $\log_7(3x + 7) = 4$

9. $\log_5 x = 3$

10. $\log(8x + 2) = \log(14)$

11. $\log_5(3x + 11) = 3$

12. $\log(3x + 4) = 2$

8.2 - Solve Logarithmic Equations Using Properties

Solve for x. Apply a property of logarithms when needed.

1. $ln(2x + 4) = 3$

2. $log_5 2 + log_5 x = 3$

3. $log_8 4x^4 - log_8 2x^2 = 1$

4. $log_4(10x - 8) = log_4(x + 4)$

5. $log_3(x + 10) - log_3 x = 4$

6. $log_2 x + log_2(x + 6) = 4$

7. $lnx + lnx^2 = 21$

8. $log_7 x^2 = log_7(x + 20)$

9. $log_4(x + 4) + log_4(x + 64) = 4$

10. $ln(3x - 8) = 2$

8.3 - Solve Exponential Equations

Solve for x.

1. $6^x = 19$

2. $8 = 14^m$

3. $5^{3w} = 38$

4. $\left(\frac{1}{8}\right)^f = 22$

5. $3 \cdot 6^v = 24$

6. $12^{2k} + 3 = 100$

7. $4 \cdot 2^{5h} - 7 = 46$

8. $\frac{1}{3} \cdot 4^{7d} = 5$

9. $\left(\frac{5}{3}\right)^{6q} - 9 = -1$

10. $7 \cdot 20^{3b} + 500 = 1745$

8.4 - Solve Exponential Equations with Binomial Exponents

Solve for x.

1. $7 \cdot 5^{w} = 21$

2. $e^{4b} = 19$

3. $8^{h+3} = 12$

4. $6^{4p-1} = 18$

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

6. $3 \cdot 11^{2c+5} = 20$

7. $7^{m+4} = 5^{m}$

8. $6^{a} = 10^{a-2}$

9. $6^{2x+1} = 5^{4x-5}$

10. $2^{k+8} = 10^{k-4}$

8.5 - Graphs of Logarithmic and Exponential Equations

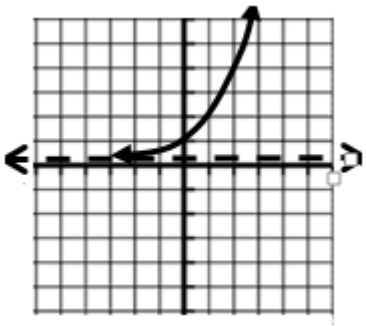
Match each equation to its graph.

_____ 1. $f(x) = log_2 x$ _____ 2. $f(x) = log_2 x + 1$ _____ 3. $f(x) = log_2(x - 1)$

_____ 4. $f(x) = 2^x$ _____ 5. $f(x) = 2^{-x}$ _____ 6. $f(x) = 2^x - 1$

_____ 7. $f(x) = -2^x$ _____ 8. $f(x) = 2^x + 1$

A



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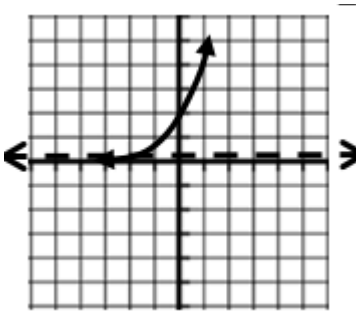

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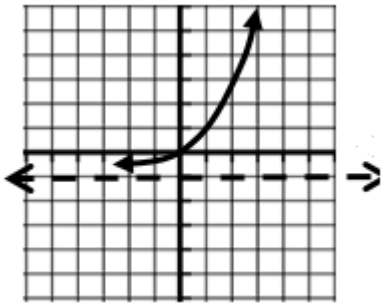

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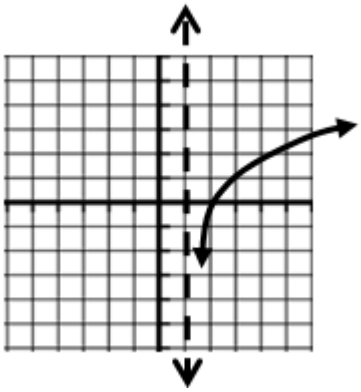

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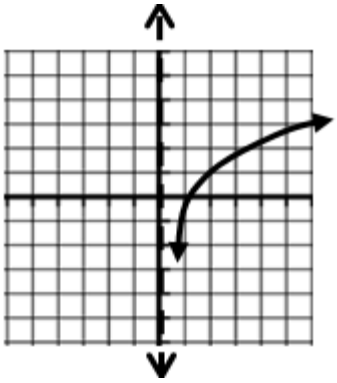

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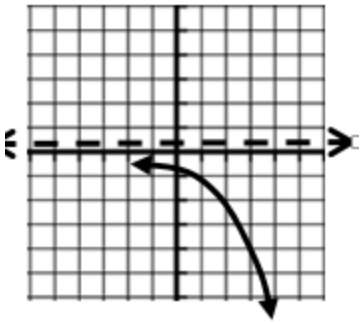

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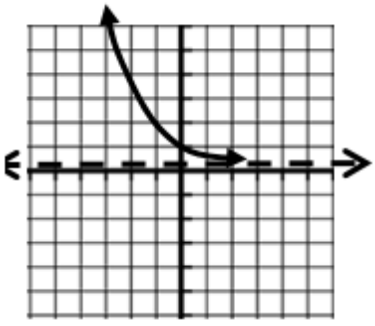

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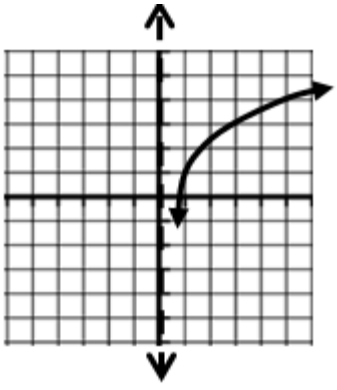

8.6 - Growth and Decay

1. A house that costs $200,000 will appreciate in value by 3% each year. Find the value of the house at the end of ten years.

2. The most recent virus that is making people ill is a fast multiplying one. On the first day, only 2 virus "bugs" are present. Each day after, the amount of "bugs" triples. Find the amount of "bugs" present by the 5th day.

3. Tobias ate half a banana in his room and forgot to throw the rest away. That night, two gnats came to visit the banana. Each night after, there were four times as many gnats hanging around the banana. On what night will there be 120 gnats in his room?

4. You drink a beverage with 120 mg of caffeine. Each hour, the caffeine in your system decreases by about 15%. How long until you have 10mg of caffeine in your system?

5. JaCorren is 60 inches and going through a growth spurt. For the next year, his growth will increase by 1% each month. Find JaCorren's height at the end of the year.

6. Ian's new Mercedes cost him $75,000. From the moment he drives if off the lot, it will depreciate in by 20% each year. When will the car with worth $50,000?

7. In 1985, there were 285 cell phone subscribers in the small town of Centerville. The number of subscribers increased by 75% per year after 1985. How many cell phone subscribers were in Centerville in 1994?

8. You have inherited land that was purchased in 1960. The value of the land increased by approximately 5% per year. What amount was the land purchased for if it is worth $360,000 in the year 2011?

9. The foundation of your house has about 1,200 termites. The termites grow at a rate of about 2.4% per day. How long until the number of termites has doubled?

8.7 - Compound Interest

1. Find the amount owed at the end 6 years if $4700 is loaned at a rate of 6% compounded monthly.

2. What amount invested at 12% interest compounded continuously for 6 years will yield $530?

3. How long does it take $800 to triple if it is invested at 8% interest compounded quarterly?

4. What amount will an account have after 20 years if $150 is invested at 4.5% interest compounded continuously?

5. Determine the amount that must be invested at 4.5% interest compounded monthly, so that $300,000 will be available for retirement in 15 years.

6. If $900 is invested at 8% interest compounded continuously, how long will it take before the amount is $1400?

7. Find the amount owed at the end 4 years if $4700 is loaned at a rate of 10% compounded semiannually.

8. If $2000 is invested at 3.5% interest compounded semiannually, how long will it take before the amount is $4300?

8.8 - Exponential Applications

1. A population of 800 beetles is growing each month at a rate of 5%. About how many beetles will there be in 8 months?

2. The half-life of a medication is the amount of time for half of the drug to be eliminated from the body. The half-life of *Advil* or ibuprofen is represented by the equation $R = M(0.5)^{0.5t}$, where *R* is the amount of Advil remaining in the body, *M* is the initial dosage, and *t* is time in hours. If a 200 milligram dosage of Advil is taken at 1:00 pm. How many milligrams of the medication will remain in the body at 6:00 pm?

3. Your new computer cost $1500 but it depreciates in value by about 18% each year.

   a. How much will your computer be worth in 6 years?

   b. About how long will it take before your computer is worth one penny, according to your equation?

4. You invest $100,000 in an account with 2% interest, compounded quarterly. Assume you don't touch the money or add money other than the earned interest.

a. How much money will you have in the account after 10 years?

b. How long will it take before you have $150,000?

5. You invest $5,000 in an account with 6% interest, compounded continuously. Assume you don't touch the money or add money other than the earned interest.

a. How much money will you have in the account after 6 years?

b. How long will it take before your money triples?