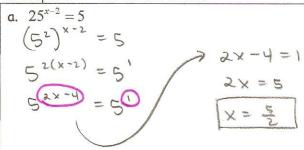
Algebra 2 Notes Name: Jey Section 7.5 - Exponential and Logarithmic Functions

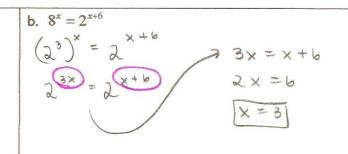
DAY ONE:

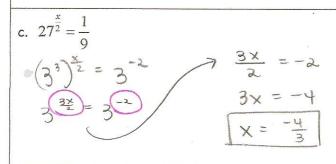
An exponential equation is an equation containing one or more expressions that have a <u>Variable</u> as an exponent. To solve exponential equations today, we will try writing them so that the bases are the same...

If $b^x = b^y$, then $\underline{\qquad} \times = \underline{\qquad}$ ($b \neq 0$, $b \neq 1$)

Example 1: Solve and check.







d.
$$\left(\frac{1}{3}\right)^{2x-3} = 27^{x}$$

$$\left(3^{-1}\right)^{2x-3} = \left(3^{+3}\right)^{x}$$

$$3^{-(2x-3)} = 3^{3x}$$

$$3 = 5x$$

$$3 = 5x$$

$$x = \frac{3}{5}$$

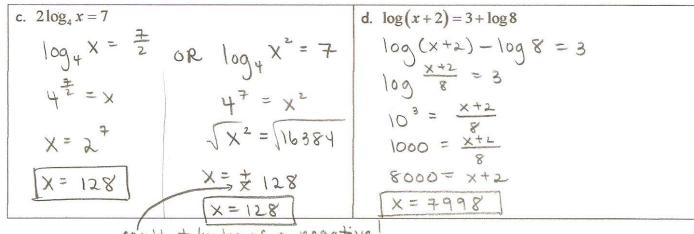
A <u>logarithmic</u> equation is an equation with a logarithmic expression that contains a <u>Variable</u>. You can solve logarithmic equations by using the properties of logarithms we learned in Section 7.4.

 $\log_b x = y$ equivalent to $b^{y} = x$. AND If $\log_b x = \log_b y$, then x = y.

Example 2: Solve and check.

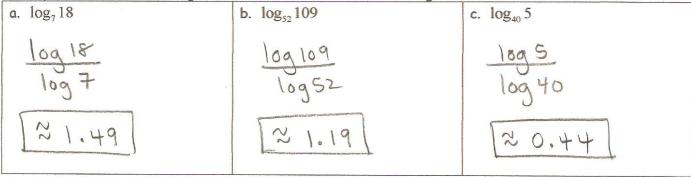
a.
$$\log_5(x-5)=2$$

 $5^2 = \chi - 5$
 $25 = \chi - 5$
 $\chi = 30$
b. $\log(45x) - \log 3 = 1$
 $\log(15\chi) = 1$
 $\log(15\chi) = 1$
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Tomorrow, we will need to be able to use the change-of-base formula. Let's review it now ...

Example 3: Use the change of base formula to evaluate each logarithm to the nearest hundredth.



DAY TWO:

Let's take some of the problems from yesterday and make them a bit more challenging. ©

Example 4: Solve and check.

a.
$$\log x + \log(x+9) = 1$$
 $\log x \times (x+9) = 1$
 $\log x \times$

Sometimes, we will solve exponential equations where it is not easy to get the same base. When this is the case, we can either take the log of both sides OR we can rewrite the equation in logarithmic form. It will be up to you which method to use, but we will show both ways in the examples.

Example 5: Solve and check. Round to the nearest hundredth

Example 5: Solve and check. Round to the nearest hundredth.	
a. $5^{x-2} = 200$	b. $10^{3x} + 6 = 25$
	10 3x = 19
1095200 = X-2	
	109,019 = 3x
X= logs 200 +2	
V- 109200 +2	log19=3x
$X = \frac{\log 200}{\log 5} + 2$	x = 10919
100 x -2 - 10 300	
[x = 5.29] OR logs = log200	[x = 0.43] OR log 10 3x = log 19
(x-2) log 5 = log 200	3x log10 = log19
Somer, x-2 = 109200	x = 100 19
(0) log 5	$x = \frac{10019}{310010}$
15N x = 100,200.	(°) [x ~ 0.43]
Somer, $x-z = \frac{\log 200}{\log 5}$ Onswert, $x = \frac{\log 200}{\log 5} + 2$	
onswer, 1095 onswer, 1095 onswer, 1095 1095 1095 1095 1095 1095 1095 1095	
0 Mg	e
c. $62^{\frac{x}{2}} - 12 = 4$	d. $2^{3x+1} = 34$
62 = 16 F 11/2 11:	Maybe you like it better
I like THIS	Hais man
$\log_{62} 1b = \frac{x}{2}$ method best.	this way
0031	log 2 3×41 = log 34
x = 2/0962/6	(3x+1) lpa 2 = loa 34
x = 2/100 16)	3×+1= 10934
$X = 2 \left(\frac{\log 16}{\log 62} \right)$	1092
(10902)	3x = 10934 -1
X % 1.34	$3x+1 = \frac{\log 34}{\log 2}$ $3x = \frac{\log 34}{\log 2} - 1$
	V = 100 34.
	1092
	$X = \frac{\log 34}{\log 2} - 1$
	x % 1.36
	- The state of the

You will need to be comfortable with how to solve both exponential and logarithmic equations. On a future assignment, as well as on the test, the types of equations will be mixed. You will need to know what method to use in order to solve the equation. Also, be sure you are checking your answers by plugging the x-value back into your original equation. \odot