Welcome back!
Please take out your notes and your blue sheet from yesterday.

Feb 16-11:23 AM

61, 47, 51

$$e^{2x} - 4e^x - 5 = 0$$
$$(e^x - 5)(e^x + 1) = 0$$
$$\ln e^x = \ln 5 \qquad \ln e^x = \ln 1$$
$$\boxed{x = \ln 5}$$
$$= 1.609$$

Mar 3-10:22 AM

Exponential Equations	Logarithmic Equations
Are the bases the same?	CONDENSE. $\log_b M + \log_b N = \log_b MN$ $\log_b M - \log_b N = \log_b \frac{M}{N}$ $\log_b M^p = p \log_b M$
Can you make the bases the same?	Is there one log on both sides of the equation? $\log_{12}(x) = \log_{12}(x^2 - 6)$ $x = x^2 - 6$ $0 = x^2 - x - 6$ $0 = (x-3)(x+2)$ $x = 3 \quad x = -2$
Take $\log_b$ of boths sides (typically ln).	Convert to exponential form. $\log_3(x^2 - 9) = 2$ $3^2 = x^2 - 9$ $9 = x^2 - 9$ $\pm\sqrt{18} = x^2$

Feb 16-11:42 AM

3.4 - Part II: Solving Log Equations

Method I: Equate Logs - Set inputs equal to each other then solve for x.

Note: Must have a single log = single log. No constants outside the logs!

$$\log_{12} x = \log_{12}(x^2 - 6)$$

$$2\log_4 x - \log_4(x+2) = 0$$
$$2\log_4 x = \log_4(x+2)$$
$$\log_4 x^2 = \log_4(x+2)$$
$$x^2 = x + 2$$
$$x^2 - x - 2 = 0$$
$$(x+1)(x-2) = 0$$
$$x = -1 \quad x = 2$$

p. 222, #91 (HW)

Jan 27-10:35 AM

1

Method II: Convert to exponential form then solve for x.

$$\log_3(x^2 - 9) = 2$$

$$\frac{8\log_5 x}{8} = \frac{16}{8}$$

$$\log_5 x = 2$$

$$5^2 = x$$

$$x = 25$$

p. 222, #85 (HW)

What happens if we have 2 logs & a constant in the equation?

Use log properties to combine logs.

$$\log_3 4 + \log_3 (x - 5) = 2$$

$$\log_3(4x-20) = 2$$

$$3^2 = 4x - 20$$

$$9 = 4x - 20$$

$$29 = 4x$$

$$\frac{29}{4} = x$$

$$\log_5 45 - \log_5 3x = 1$$

$$\log_5 \frac{45}{3x} = 1$$

$$\log_5 \frac{15}{x} = 1$$

$$5^1 = \frac{15}{x} \cdot x$$

$$5x = 15$$

$$x = 3$$

p. 222, #101 (HW)

Jan 27-11:20 AM   Jan 27-11:20 AM

Graphical approaches...

$$\log_{10}(8x) - \log_{10}(1 + \sqrt{x}) = 2$$

y_1 y_2

p. 222, #121 (HW)

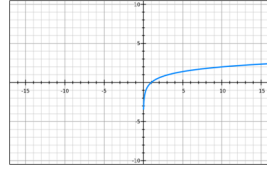# HOMEWORK
...solving equations (due tomorrow)

3.4 (p221): 17-61 (1,5,7's); omit 31-37
85-135 (1's and 5's only; omit 105, 111, and 115)

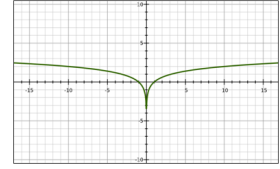Feb 16-11:26 AM   Feb 9-9:56 AM

True or false: $\log x + \log x = \log x^2$

True or false: $\log x + \log x = \log x^2$

$$f(x) = \log x + \log x \qquad\qquad f(x) = \log x^2$$

Feb 16-11:35 AM

Feb 16-11:35 AM