

Bell Work: Get a Book and Finish From Last Time...

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PRE-CALC TRIG

Day 25



Review: Properties of Logarithms

$$\log_a 1 = 0 \quad \rightarrow a^0 = 1$$

$$\log_a a = 1 \quad \rightarrow a^1 = a$$

$$\log_a a^x = x \quad \rightarrow a^{\log_a x} = x$$

$$\log_a x = \log_a y \Rightarrow x = y$$

Review: More Properties

Change of Base: (not as important with our calculators)

$$\log_a x = \frac{\log_b x}{\log_b a}$$

Product Property

$$\log_a(uv) = \log_a(u) + \log_a(v)$$

Quotient Property

$$\log_a(u/v) = \log_a(u) - \log_a(v)$$

Power Property

$$\log_a u^n = n \log_a(u)$$

Rewrite:

$$\log_b y = x \quad < = > \quad b^x = y$$

3.4 Exponential and Log Equations

■ Objective:

Solve exponential and log equations

Strategies to Solve:

- 1.) One to One: rewrite so the bases are the same and compare
- 2.) Rewrite exponential in log form and apply the Inverse Property
- 3.) Rewrite log in exponential form and apply the Inverse Property

Examples: Solve

1.) $3^x = 81$

2.) $\ln x - \ln 2 = 0$

3.) $2^x = 8$

4.) $\log_6 2x = 4$

Examples

$$1.) \quad 3^x = 81 \qquad 3^x = 3^4 \qquad x = 4 \qquad \text{One to One}$$

$$2.) \quad \ln x - \ln 2 = 0 \qquad \ln x = \ln 2 \qquad x = 2 \qquad \text{One to One}$$

$$3.) \quad 2^x = 8 \qquad \log_2 2^x = \log_2 8 \qquad x = 3 \qquad \text{Inverse}$$

$$4.) \quad \log_6 2x = 4 \qquad 6^{\log_6 2x} = 6^4 \qquad 2x = 4 \qquad x = 2 \qquad \text{Inverse}$$

Answer the following.

You have deposited \$600 in an account that pays 7.5% interest compounded continuously. Use the $A = Pe^{rt}$, where P is in initial deposit r is the percent (written as decimal) and t is the time in years. How long will it take to double your money? Triple?

Set Up Solution

$$A = Pe^{rt} \quad \rightarrow 1800 = 600e^{0.075t} \rightarrow 3 = e^{0.075t} \rightarrow t = ???$$

$$P = 600$$

$$r = 0.075$$

$$A = 1800 \text{ (tripled the } P\text{)}$$

$$t = \text{time}$$

Additional Examples

1.) $8(2)^x - 10 = 70$

5.) $3^{5x} = 3^{3x-8}$

2.) $5(3)^{6x-12} + 12 = 32$

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

3.) $4e^{x+1} = 12$

7.) $\ln(6x - 1) = 3$

4.) $4\log_2(2x + 9) - 21 = 3$

For Next Time

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38, 63, 67, 87, 97, 129