

Bell Work: Is the following exponential growth or decay?

$$y = 2^{x-4}$$

$$y = 0.3^x + 4$$

Find key points to graph it on paper.
(y-intercept, x-intercept, and/or use trace
button)

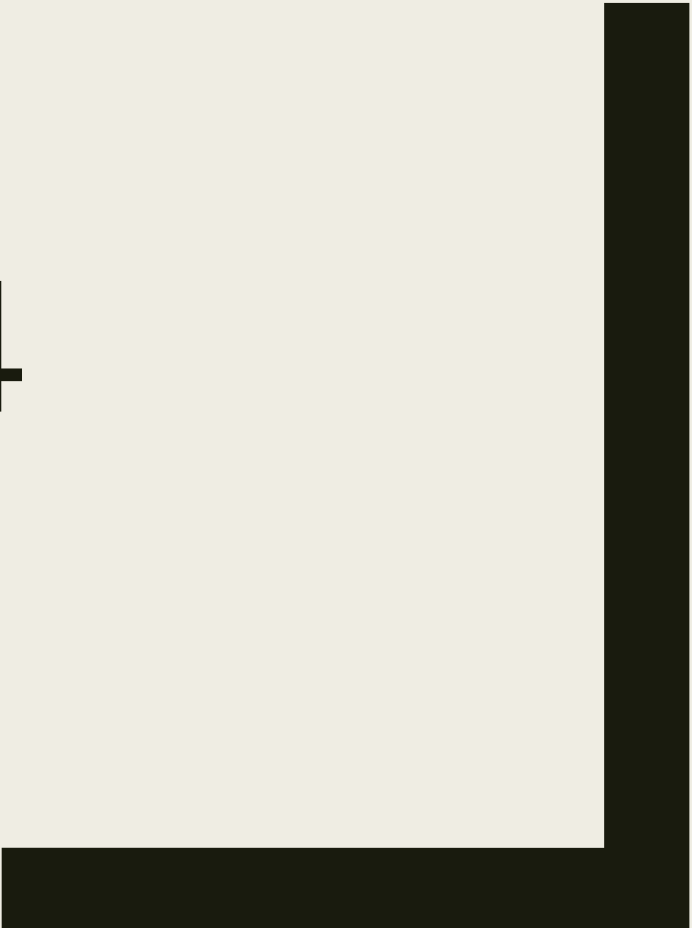
$$y = 2^{x-4}$$

$$y = 0.3^x + 4$$



ALGEBRA 4

Day 73



From Last Time

Page 439 # 1, 3, 5, 7, 8, 26

Page 447 # 17, 19, 29, 32

7.3 Logarithmic Functions as Inverses

7.4 Properties of Logarithms

■ Objectives:

To write and evaluate logarithmic expressions

To use the properties of logarithms

7.3 Logarithmic Functions as Inverses

Objective: To write and evaluate logarithmic expressions

Logarithmic Function with Base a:

$$f(x) = \log_b(x - h) + k$$

where $x > 0, b > 0, b \neq 1$

Common Log:

log with a base 10
 $\log_{10} x = \log x$

Rewrite from Exponential to Logarithmic:

$$\log_b y = x \iff b^x = y$$

Rewrite: From log to exponential or
exponential log

$$\log_2 8 = 3$$

$$5^3 = 125$$

Evaluate

$$\log_7 49$$

$$\log_{12} 12$$

$$\log_2 64$$

7.4 Properties of Logarithms

Objective: To use the properties of logarithms

Properties of Logarithms

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

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

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

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

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:

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

Examples

Expand:

$$\log_5 25x^3$$

Condense:

$$5 \log_6 x + 2 \log_6 7 - 3 \log_6 w$$

Simplify:

$$\log_4 4$$

$$\log_3 81$$

$$\log_8 1$$

$$9^{\log_9 4x}$$

$$\log_7 49^{3x}$$

For Next Time...

Page 457 # 1-9, 13-27(odd)

Page 465 # 1-4, 30-33