WARM UP - Calculator

1) If you invest $4500 in an account compounded continuously at 3.2%, how much will you have in the account after 15 years?

$A = Pe^{rt}$

$$7,272.33$$

$A = 4500 e^{.032(15)}$

2) The population of a small town in Colorado is 8320 and is growing at a rate of 2.4% per year. What is the predicted population in 6 years?

$y = ab^x$

.024

$y = 8320(1.024)^6$ 9,592 people
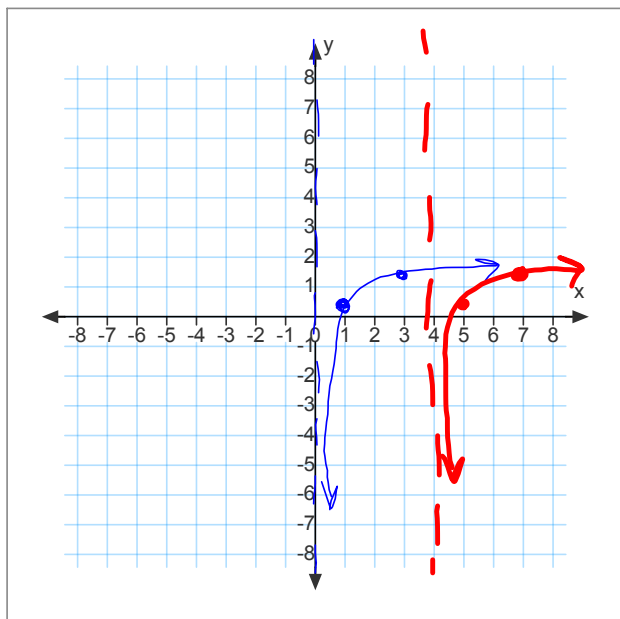
Evaluate each. No calculator.

3) $\log_{16} 4 = x$

$16^x = 4$

$x = \frac{1}{2}$

4) $\log \frac{1}{1000} = x$

$10^x = \frac{1}{1000}$

$x = -3$

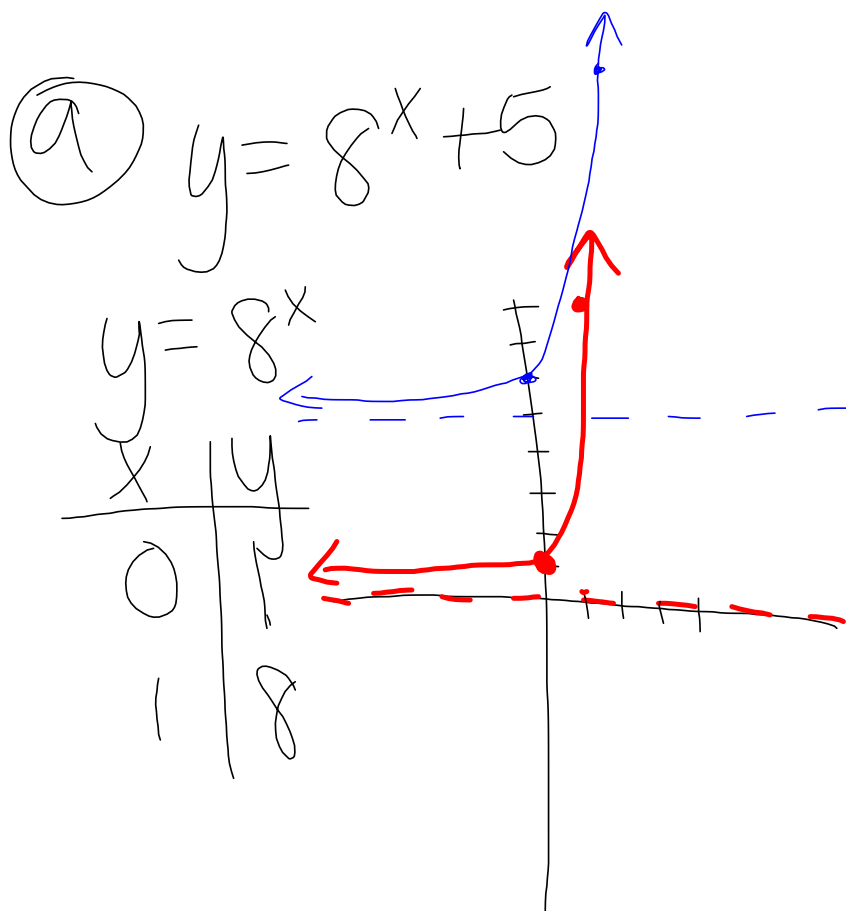5) Graph:

$$y = \log_3(x - 4)$$

$y = \log_3 x$

$(1, 0)$ $(6, 1)$

$(3, 1)$

(a) $y = 8^x + 5$

$y = 8^x$

x	y
0	1
1	8

8.4
Properties of Logarithms

Properties of Logarithms

- Let all variables be positive numbers and b≠1.

- **<u>Product property:</u>**

- $\log_b MN = \log_b M + \log_b N$

- **<u>Quotient property:</u>**

- $\log_b \dfrac{M}{N} = \log_b M - \log_b N$

- **<u>Power property:</u>**

- $\log_b M^x = x \cdot \log_b M$

Expanding Logarithms

- You can use the properties to expand logarithms.

- $\log_2 \dfrac{7x^3}{y} =$

- $\log_2 7x^3 - \log_2 y =$

- $\log_2 7 + \log_2 x^3 - \log_2 y =$

- $\log_2 7 + 3 \cdot \log_2 x - \log_2 y$

Your turn:

- 1) Expand:

- $\log 5\sqrt{3a} =$

$$\log 5 + \log(3a)^{1/2}$$

$$\log 5 + \frac{1}{2}(\log 3a)$$

$$\log 5 + \frac{1}{2}(\log 3 + \log a)$$

- 2) Expand:

- $\boxed{\log_8 8x^3} =$

$$\log_8 8 + \log_8 x^3$$

$$\log_8 8 + 3 \cdot \log_8 x$$

Write as a single log. *(Condensing)*
Example:

- log 6 + 2 log2 – log 3 =

- log 6 + log 2^2 – log 3 =

- log (6·2^2) – log 3 =

- log $\dfrac{6 \cdot 2^2}{3}$ = log $\dfrac{24}{3}$

- log 8

Your turn! Write as a single log (condense)

- 3)
- $\log_5 7 + 3 \cdot \log_5 t =$

$$\log_5 7 + \log_5 t^3$$

$$\log_5(7t^3)$$

- 4)
- $3\log_2 x - (\log_2 4 + \log_2 y) =$

$$\log_2 x^3 - \log_2 4y$$

$$\log_2 \frac{x^3}{4y}$$

Assignment

p. 457 #11-30 all

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