Learning Goal: I will be able to evaluate logarithms and simplify logarithmic expressions at write a power with different bases.

Minds On: Changing bases to solve!

Action: Examples

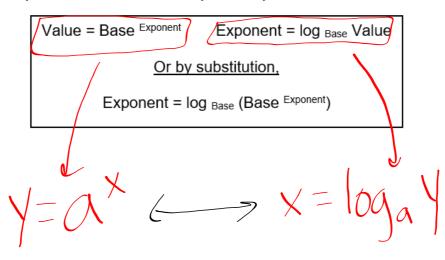
Consolidation: page 466 Practice + Exit Card



Evaluating Logarithms

We should realize by now that a logarithm is an *exponent* and that the logarithm is the answer to the question: *To what power must the base be raised to produce a specific value?*

Evaluate simple logarithmic expressions using the relationship between powers and logarithms. One strategy is to replace the value with its equivalent power.



Minds On

Minds On:

1. Evaluate each logarithm.

b)
$$\log_3 27 = 3$$

$$3^{4} = 27$$

 $3^{4} = 3^{3}$
e) $\log_{5}(1/5) = -1$

$$5^{9} = \frac{1}{5}$$

c)
$$\log_2 32 = 5$$

 $2^5 = 32$
 $2^5 = 2^5$
f) $\log_6 1 = 0$

2. Write each logarithm in exponential form.

a)
$$\log_2 8 = 3$$

$$2^3 = 6$$

d)
$$log_5 625 = 4$$

b)
$$\log_6 36 = 2$$

$$6^2 = 36$$

e)
$$log_3 3 = 1$$

c)
$$\log_{16} 4 = \frac{1}{2}$$

f)
$$\log_{10} 1 = 0$$

$$| \int_0^0 = |$$

Minds On

3. Write each exponential equation in logarithmic form.

a)
$$3^7 = 2\dot{1}87$$

c)
$$5^{-2} = 0.04$$

d)
$$7^3 = 343$$

e)
$$8^4 = 4096$$

f)
$$16^{1.5} = 64$$

Action

Example 1: Use the definition of a logarithm to determine the value of each expression.

44 = 64

=3

c) log2(-4) impossible!

Toget a regative value is ing the mexponent: start ith results in exponent: start odd exponent. b) $\log_{3}\frac{1}{27} - \sqrt{ }$

3 = -3

d) $\log_5 \sqrt[3]{25} > 9$

Action

Example 1: Evaluate each of the following logarithms:

a) $\log_6 1 = 4$



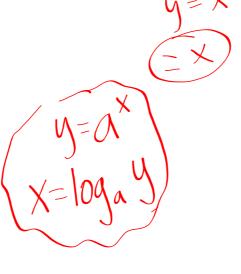
c) $6^{\log_6 x} = U$

1096 X = 1096 4

$$=X$$

b) $\log_5 5^x = U$





Action

Example 3: Determine an approximate and an exact value of log₅47.

Solution A: Guess and check

$$y=log_547$$
 $5^9=47$
 $5^2=25$
 $5^3=125$
 $5^{2.5}=55.9$

$$5^{2.4} = 47.6$$

$$5^{2.3} = 40.5$$

$$5^{2.36} = 46.1$$

$$5^{2.39} = 46.9$$

$$5^{2.392} = 46.9$$

$$= approximately 2.392$$

Solution B: Using techology

$$y = log_5 47$$
 $5^9 = 47$

Exit Questions

Exit Questions

b)
$$\log_{1/4} x = -2$$

 $(\frac{1}{4})^{-2} = X$
 $(\frac{1}{4})^{2} = X$

Exit Questions

c)
$$\log_2 32^{1/3} = 9$$

$$2^9 = 32^{\frac{1}{3}}$$

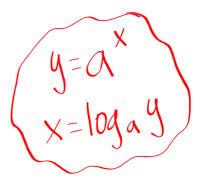
$$2^9 = (2^5)^{\frac{1}{3}}$$

$$2^9 = 2^{\frac{5}{3}}$$

$$2^9 = 5^{\frac{5}{3}}$$

Exit Questions

d)
$$3^{\log_3 11} = 4$$
 $|09_3|| = |09_3||$
 $|9 = |1|$



Practice

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1 - 3, 5, 6, 9 - 11, 14