

BE - Alg. 2 | MONDAY 4-5-10

① GIVEN $f(x) = \frac{x+6}{2}$

$$g(x) = 2x - 6$$

④ Find $(f \circ g)(x)$ or $f[g(x)]$

⑤ Find $(g \circ f)(x)$ or $g[f(x)]$

⑥ Does $g(x) = f^{-1}(x)$?

REF. EX 2 Pg 391 in Ch. 7-8 "INVERSE FUNCTIONS AND RELATIONS"

ANS

④ $f[g(x)] \Rightarrow f(x) = \frac{x+6}{2}$

$$\begin{aligned} f(2x-6) &= \frac{(2x-6)+6}{2} \\ &= \frac{2x}{2} = \boxed{x} \checkmark \end{aligned}$$

⑤ $g[f(x)] \Rightarrow g(x) = 2x - 6$

$$g\left(\frac{x+6}{2}\right) = 2\left(\frac{x+6}{2}\right) - 6$$

$$= x+6-6 = \boxed{x} \checkmark$$

⑥ Yes, $g(x)$ is the inverse function of $f(x)$. And $f(x)$ is the inverse of $g(x)$. $f(x)$ is a ONE-TO-ONE function.

How do you find the inverse of a function?

If $f(x) = \frac{x+6}{2}$ how could you find its inverse?

Swap the x & y 's

$$y = f(x) = \frac{x+6}{2}$$

$\therefore$

$$f^{-1}(x) \Rightarrow x = \frac{y+6}{2}$$

$$2x = y + 6$$

$$\boxed{y = 2x - 6} \quad \checkmark$$

Does an exponential function, like $y = 2^x$ have an inverse?

2

If $y = f(x) = 2^x$ then $f^{-1}(x)$

$$\Rightarrow x = 2^y$$

How do you get
y "by itself"?

Define y as follows:

y is the exponent of the base 2
which equals X.

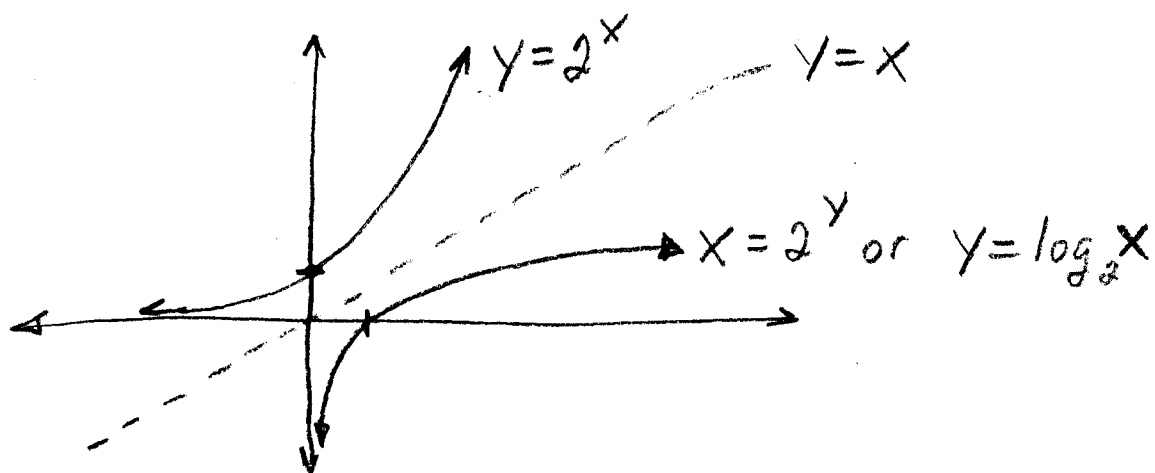
or

y is the logarithm of the base
2 which gives you X.

A logarithm is an exponent...

A logarithm is an exponent...

A logarithm is an exponent...



$y = \log_2 x$ read $y =$ the log to the base 2 of x

or y is the exponent of base 2 that equals x .

A logarithm is an exponent...
(did I mention this?)

General: $y = \log_b x$ means $b^y = x$

read: $y =$ the log to the base b of x .

Ch. 10-2 Logarithms and Logarithmic Functions

In general, the base will be any positive number (except 1).

Two special bases: $10 \Rightarrow$ common logs $\log$
 $e \Rightarrow$ NATURAL logs $\ln$
 $\approx (2.718...)$

Everything else $\Rightarrow \log_b$
 b must show base.

LOGARITHMS ARE EXPONENTS,
 EXPONENTS MUST HAVE
 A BASE. ONCE YOU
 ID the log. AND base
 (EXONENT)
 WHAT IS left is what
 the base raised to that
 exponent equals.

$$\textcircled{EX} \log_3 X = 2 \Rightarrow 3^2 = 9 \therefore \log_3 9 = 2$$

$$\log_5 X = 3 \Rightarrow 5^3 = 125 \therefore \log_5 125 = 3$$

$$\log_2 16 = X \Rightarrow 2^X = 16 \therefore X = 4$$

$$\log_2 16 = 4$$

Ex1 Pg 532 WRITE IN EXPONENTIAL form

$$\textcircled{A} \log_8 1 = 0 \quad \therefore \boxed{8^0 = 1}$$

$$\textcircled{B} \log_2 \frac{1}{16} = -4 \quad \therefore \boxed{2^{-4} = \frac{1}{16}}$$

Better $\log_2 \left(\frac{1}{16}\right) = -4$

Ex2 Pg 532 WRITE IN LOGARITHMIC form

$$\textcircled{A} 10^3 = 1000$$

$$\boxed{\log_{10}(1000) = 3} \quad \text{or} \quad \log 1000 = 3$$

↑
NO BASE = "COMMON" log
SHOWN = base 10

$$\textcircled{B} 9^{\frac{1}{2}} = 3$$

$$\boxed{\log_9 3 = \frac{1}{2}}$$

A logarithmic equation is an equation with one or more logarithms in it. Use the definition of logarithms to solve them... Remember: A logarithm is an?

Ex 5 Pg 533 Solve $\log_4 N = \frac{5}{2}$

$$4^{\frac{5}{2}} = N$$

$$2\sqrt{4^5} = N$$

$$(2\sqrt{4})^5 = N$$

$$2^5 = N$$

$$\boxed{32 = N}$$

ck
 $\log_4 32 \stackrel{?}{=} \frac{5}{2}$
 $4^{\frac{5}{2}} \stackrel{?}{=} 32 \checkmark$

Homework: Pg. 535 # 4-13

• Read Ch. 10-2