

AA PREP—INTRODUCTION TO LOGARITHMS LECTURE

EX 1: Solve for x.

a) $2^x = 16$
 $2^x = 2^4$
 $x = 4$

b) $\left(\frac{1}{2}\right)^x = 8$
 $2^{-x} = 2^3$
 $-x = 3$
 $x = -3$

c) $\left(\frac{1}{8}\right)^{x+1} = 32^{-2x}$
 $2^{-3(x+1)} = 2^{5(-2x)}$
 $-3(x+1) = 5(-2x)$
 $-3x - 3 = -10x + 3x$
 $-3 = -7x + 3$
 $-6 = -7x$
 $x = \frac{6}{7}$

d) $2^x = 20$
 + WE GET STUCK!
 WE CANNOT
 EXPRESS 20 AS
 A POWER OF 2.
 ESTIMATE... $2^4 = 16$
 $2^5 = 32$
 $x \approx 4.3$

EX 2: Write the exponential equation in logarithmic form.

a) $2^{-5} = \frac{1}{32}$
 $\log_2 \frac{1}{32} = -5$

b) $1 = 4^0$
 $\log_4 1 = 0$

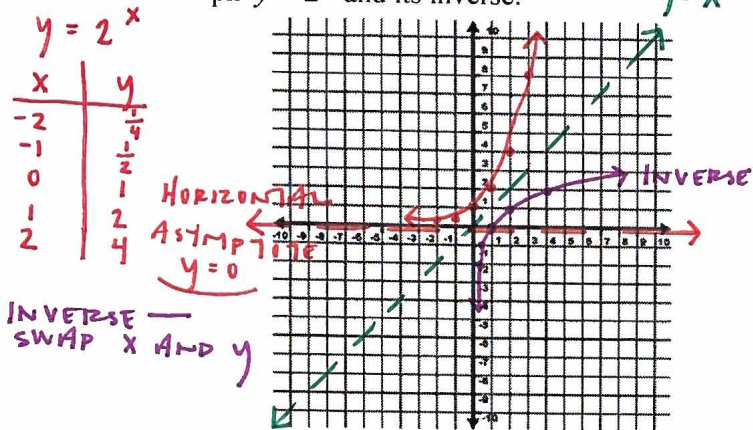
EX 3: Write the logarithmic equation in exponential form.

a) $\log_3 81 = 4$
 $3^4 = 81$

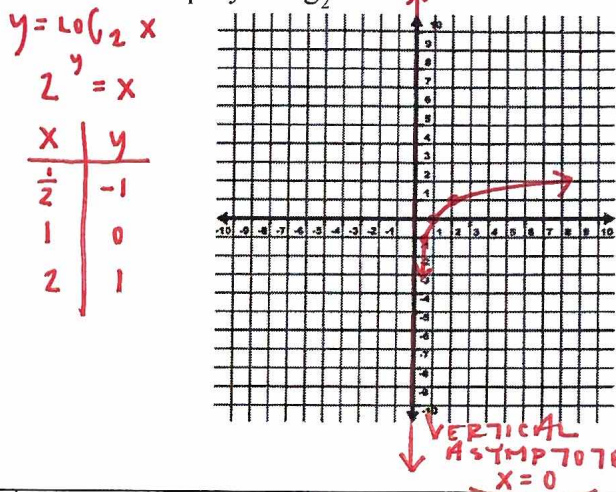
b) $\frac{1}{2} = \log_{16} 4$
 $16^{\frac{1}{2}} = 4$

REFLECTION LINE

EX 4: Graph $y = 2^x$ and its inverse.



EX 5: Graph $y = \log_2 x$



EX 6: Evaluate.

a) $\log_6 6$ $6^x = 6$ $x = 1$	b) $\log_6 1$ $6^x = 1$ $x = 0$
c) $\log_6 \frac{1}{36}$ $6^x = \frac{1}{36}$ $x = -2$	d) $\log_{36} 6$ $36^x = 6$ $x = \frac{1}{2}$

EX 7: Solve for x.

a) $\log_{49} x = \frac{1}{2}$ $49^{\frac{1}{2}} = x$ $\sqrt{49} = x$ $x = 7$	b) $\log_{64} 16 = x$ $64^x = 16$ $4^{3x} = 4^2$ $\frac{3}{4}x = \frac{2}{4}$ $x = \frac{2}{3}$
c) $\log_x 8 = 3$ $\sqrt[3]{x^3} = \sqrt[3]{8}$ $x = 2$	d) $\log_{25} \frac{1}{125} = x$ $25^x = \frac{1}{125}$ $5^{2x} = 5^{-3}$ $\frac{2}{5}x = -\frac{3}{5}$ $x = -\frac{3}{2}$