Math 146 Quiz Dec 3 name:_____

1. Find the inverse function for $f(x) = x^3 + 1$

$y = x^3 + 1$

$x = y^3 + 1$

$y^3 + 1 = x$

$-1 \quad -1$

$y^3 = x - 1$

$(y^3)^{1/3} = (x-1)^{1/3}$

$y = \sqrt[3]{x-1}$

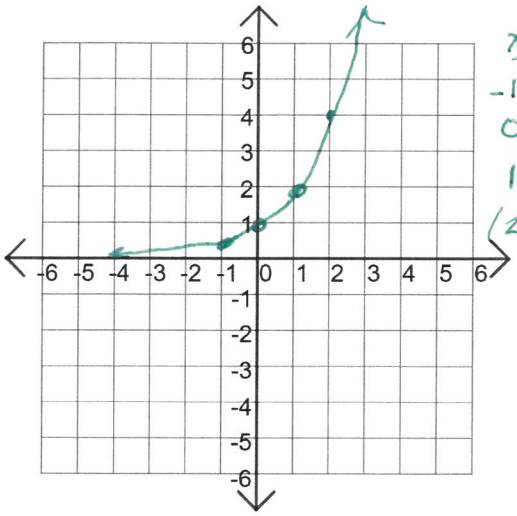
$y = 2^x$

$x = 2^y$ ← is a function

one $x = 4$

one $y = 2$

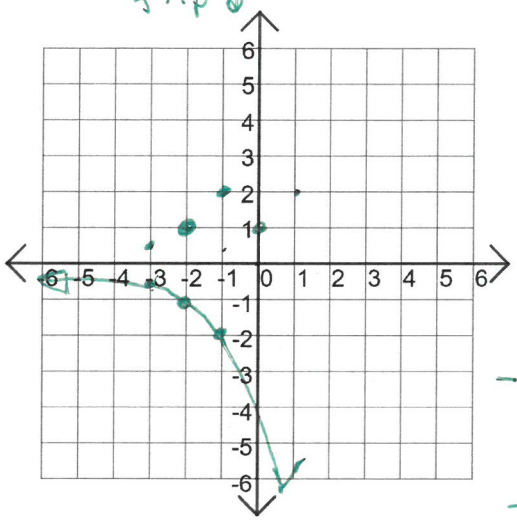
2. a. Graph $f(x) = 2^x$



x	y
-1	$2^{-1} = \frac{1}{2}$
0	1
1	2
(2	4)

b. Graph $g(x) = -2^{x+2}$ by transforming $f(x) = 2^x$

flip ↕



$x + 2 = 0$

$x = -2$

left 2

-2^2

$-(2^2)$ $\quad$ $(-2)^2$

$=$ $\quad$ $=$

-4 $\quad$ 4

3. Solve for x: $2^{3-2x} = 8$

$2^{3-2x} = 8$

$2^{3-2x} = 2^3$

$3 - 2x = 3$

$-2x = 0$

$x = 0$

$y = 2^x$ inverse function

$x = 2^y$

make up a name for this

$y = \log_2 x$

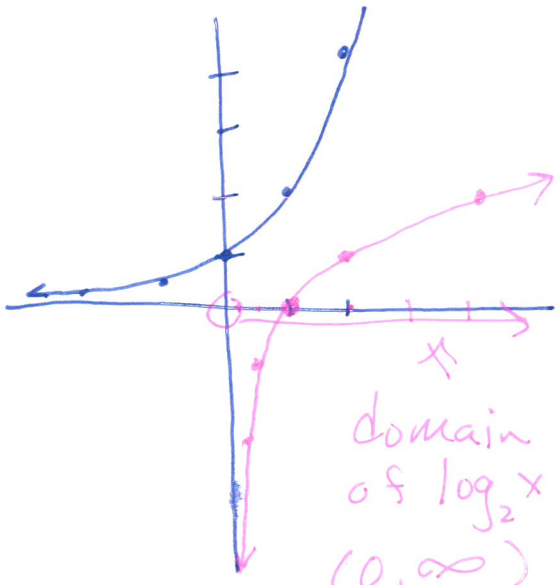
$y = 2^x$

x	y
-2	$\frac{1}{4}$ ← $\frac{1}{2^2}$
-1	$\frac{1}{2}$
0	1
1	2
2	4

Inverse

$y = \log_2 x$

x	y
$\frac{1}{4}$	-2
$\frac{1}{2}$	-1
1	0
2	1
4	2



domain of $\log_2 x$ $(0, \infty)$

$\log_2(2) = y$ $\quad 2^y = 2$

$y = 1$

→ $\log_3(9) = 2$ ($3^2 = 9$)

$\log_{10}(1000) = 3$

$\log_2(8) = 3$

$\log_5(\sqrt{5}) = 1/2$

→ $\log_3\left(\frac{1}{3}\right) = -1$ ($3^{-1} = \frac{1}{3}$)

$\log_3(1) = 0$

→ $\log_2(1) = 0$ ($2^0 = 1$)

$\log_2\left(\frac{1}{4}\right) = -2$

Exponet	same meaning	logarithm
$2^a = b$		$\log_2 b = a$
$3^y = x$		$\log_3 x = y$
$2^4 = x$		$\log_2 x = 4$
$2^3 = n$		$\log_2 n = 3$
$e^c = d$		$\log_e d = c$
$10^n = m$		$\log_{10} m = n$

$$x = \log_3 \frac{1}{81} \longleftrightarrow 3^x = \frac{1}{81}$$

$$3^x = \frac{1}{3^4}$$

$$3^x = 3^{-4}$$

$$x = -4$$

$$x = 12^{\log_{12} 5} \longleftrightarrow \log_{12} x = \log_{12} 5$$

$$x = 5$$

$$x = \log_5 \sqrt[4]{25} \longleftrightarrow 5^x = \sqrt[4]{25}$$

$$= \sqrt[4]{5^2}$$

$$= (5^2)^{1/4}$$

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

$$x = \frac{2}{4} = \frac{1}{2}$$

Invest $1000

12% per year

compound monthly

end of 1 year
compound annually

$(1.12)1000$

↓

end of year

1,120

end of one year
compound monthly

$(1.01)^{12}\,1000$

↓

end of year.

1,126.83

Invest principal P (1000)

Compounds n times per year (12)

For t years (1)

Annual interest rate r ($.12 = 12\%$)

Money at the end (Future value) $= A$

$$A = \left(1 + \frac{r}{n}\right)^{nt} P \quad \star$$

Invest $3000; 4% per year
compound monthly
5 years.

$5 \cdot 12 = 60$

$$A = (3000)(1.00333)^{60}$$

1.0333

1.00333

4.2 # 87a, 88a

4.3 # 1 a, b, c, d, e

13, 17, 19, 21, 25, 27, 29