If you did the assignment, pick up the solutions.

HW Help

Later pick up the warm up.

A better way to write 6lc

$-\infty < x < \infty, \ x \neq 7$

1. Solve the quadratic equation $x^2 = -6x - 2$ using "completing the square" rather than

$$x^2+6x+2=0$$

$$\left(\frac{6}{2}\right)^2$$

	x	3
x	x^2	$3x$
3	$3x$	9

$$x^2+6x+9=-2+9$$

$$\sqrt{(x+3)^2}=\sqrt{7}$$

$$x+3=\pm\sqrt{7}$$

$$-3 \qquad -3$$

$$x=-3\pm\sqrt{7}$$

2. Add the rational expressions

$$3+6x-24$$

$$\frac{3}{(x-4)(x+1)}+\frac{6}{(x+1)}\frac{(x-4)}{(x-4)}=\frac{3+6(x-4)}{(x-4)(x+1)}$$

$$=\frac{6x-21}{(x-4)(x+1)}$$

$$3(2x-7)$$

Willie's solution

$9 - x \le 7$

$-9 \qquad -9$

$-1(-x) \le (-2)(-1)$

reversal

$x \ge 2$

Nilly's solution

$9 - x \le 7$

$+x \qquad +x$

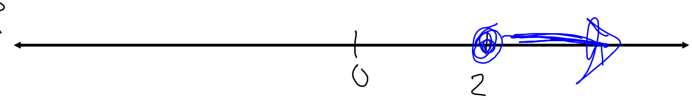
$9 \le x + 7$

$-7 \qquad -7$

$2 \le x$

Solution: $x \ge 2$

its graph



$10 = 10$

$-10 = -10$

$2 < 3$

$-2 < -3$

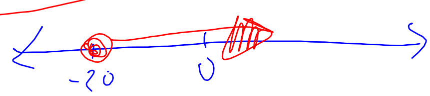
4. Now solve the inequality $\frac{4-x}{2} \leq 12$. Then graph on a number line.

$$\cancel{2}\left(\frac{4-x}{\cancel{2}}\right) \leq (12)2$$

$$4-x \leq 24$$
$$-4 \qquad\qquad -4$$

$$-x \leq 20$$

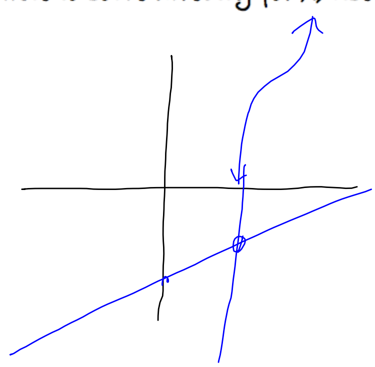
$$x \geq -20$$



5. Solve the following inequality. Since you won't be able to solve directly for x, use the boundary point/Test point method.

$$\underbrace{(x-4)^3 + 6}_{Y_1} \leq \underbrace{x-4}_{Y_2}$$

x^3



Find the intersections (2, -2)

$x \leq 2$

Boundary Points

$x = 2$

Test $x = 4$

$\cancel{(4-4)^3} + 6 \leq 4-4$ $\quad 6 \nleq 0$

6. Find the inverse of $(x-3)^2+(y-1)^2 = 4$ and graph it.

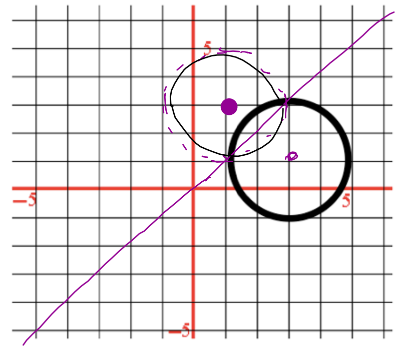
$(y-3)^2+(x-1)^2=4$

$(x-1)^2+(y-3)^2=4$

$\sqrt{(y-3)^2} = \sqrt{4-(x-1)^2}$

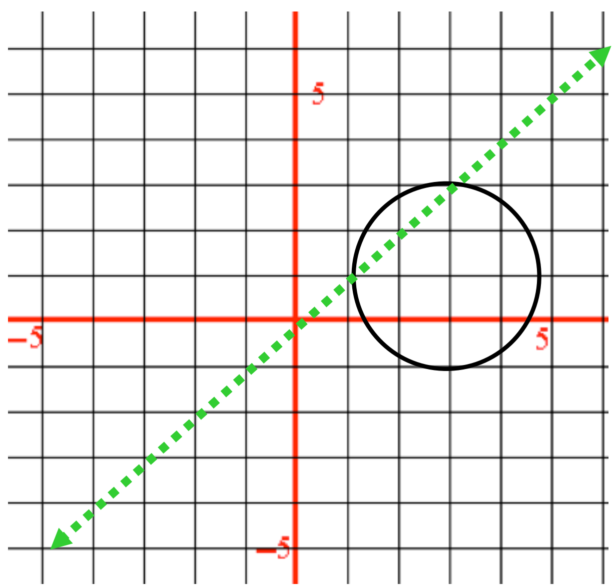
$y-3 = \pm\sqrt{4-(x-1)^2}$

$y = 3 \pm\sqrt{4-(x-1)^2}$



$(x-3)^2+(y-1)^2 = 4$

$(y-3)^2+(x-1)^2 = 4$



Example of work with excellent Qualities

c. $\left(\frac{2x}{5}\right)^{\frac{3}{3}}\left(\frac{1}{3}\right)^{\frac{5}{5}}=\left(\frac{137}{3}\right)^{\frac{5}{5}}$ $\frac{6x-5}{15}=\frac{685}{15}$

$\frac{6x}{15}-\frac{5}{15}=\frac{685}{15}$ $6x-5=685$

$6x=690$

$\boxed{x=115}$

$3x-1=0$ or $x-1=$

$\boxed{x=1/3 \quad + \quad x=1}$

51.) a. $y=x^2+3$

$x=y^2+3$

$y^2=x-3$

$y=\sqrt{x-3}$

$\boxed{f^{-1}(x)=\pm\sqrt{x-3}}$

b. $y=(1/4x+6)^3$

$x=(1/4y+6)^3$

$\sqrt[3]{x}=1/4y+6$

$1/4y=\sqrt[3]{x}-6$

$y=4(\sqrt[3]{x}-6)$

$\boxed{f^{-1}(x)=4(\sqrt[3]{x}-6)}$

c. $y=\sqrt{5x-6}$

$x=\sqrt{5y-6}$

$x^2=5y-6$

$5y=x^2+6$

$y=\frac{x^2+6}{5}$

$\boxed{f^{-1}(x)=\frac{x^2+6}{5}}$

Algebra 2b Hw: Ch.5 # 48-49, 50bc, 51-52, 54ac

48.) a. $g(f(3))=((5(3)-3)-1)^2$

$g(f(3))=(12-1)^2$

$\boxed{g(f(3))=121}$

b. $g(x)=(x-1)^2$

$g(3)=(3-1)^2$

$g(3)=4$

$f(4)=5(4)-3$

$\boxed{f(4)=17}$

49.) a. $(x+1)(2x^2-3)$

$=2x^3-3x+2x^2-3$

$=\boxed{2x^3+2x^2-3x-3}$

b. $(x+1)(x^2-2x+3)$

$=x^3-2x^2+3x+x^2-2x+3$

$=\boxed{x^3-x^2+x+3}$

Change of Plan

The Ch. 5 Test will be this Friday <u>not</u> Thursday

<u>See Your LCQ</u>

* "SS" see the solutions
* No cell phones out
* I'll collect them when finished.

$$x-5=\frac{2}{7}y^3$$

$$7(x-5)=2y^3$$

$$\frac{7(x-5)}{2}=y^3$$

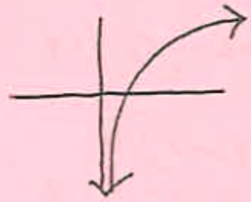
$\boxed{\text{QUESTIONS ON HW}}$

first look at #60

Alg 2 Solutions

5-60 Investigate the inverse of $y = 3^x$ $\qquad$ $x = 3^y$ ← inverse

* start by sketching its graph which can be done by making a table and reversing the coordinates or by "drawing" the inverse on your calculator



* Find domain and range

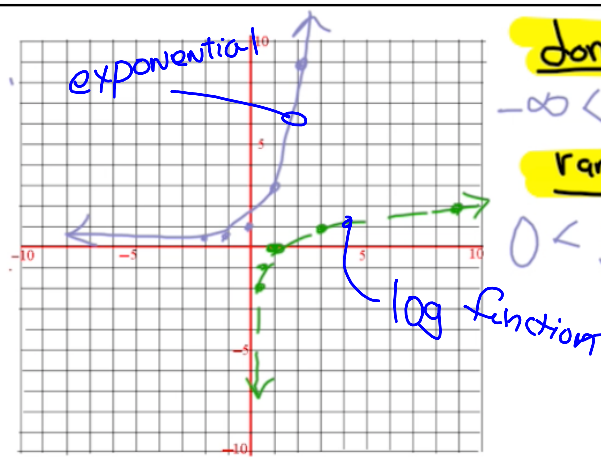
domain: $0 < x < \infty$

or it can be written as $x > 0$

range: $-\infty < y < \infty$

$y = 3^x$

x	-2	-1	0	1	2
y	$\frac{1}{9}$	$\frac{1}{3}$	1	3	9



domain

$-\infty < x < \infty$

range

$0 < y < \infty$

Now the inverse

$x = 3^y$

x	$\frac{1}{9}$	$\frac{1}{3}$	1	3	9
y	-2	-1	0	1	2

domain

$0 < x < \infty$

range

$-\infty < y < \infty$

$y =$ the exponent of 3 to get x ← logarithm

* Find intercepts   x-intercept (set $y=0$) $\Longrightarrow$ $x = 3^0$

so, $x=1$

$\therefore$ x-intercept is $(1,0)$

* Asymptotes

only a vertical line : the equation $x=0$

$\boxed{5-61}$ $f(x) = \frac{2}{7-x}$

a) $f(7) = \frac{2}{7-7} = \frac{2}{0}$ undefined

b) domain

(x can be all values, but not 7)

$-\infty < x < 7, \quad 7 < x < \infty$

c) $g(3) = 2(3)+5 = \boxed{11}$

d) $f(g(3)) = \frac{2}{7-11}$

$= \frac{2}{-4}$

$= \boxed{-\frac{1}{2}}$

$-\infty < x < \infty,$

$x \neq 7$

$\boxed{5\text{-}62}$ $f(x) = 1 + \sqrt{x+5}$

(a) find the inverse and call it $e(x)$

$y = 1 + \sqrt{x+5}$

switch x's and y's ← and switch domain and range

$x = 1 + \sqrt{y+5}$

$-1 \quad -1$

$\sqrt{y+5} = x-1$

$(\ )^2$ square both sides $(\ )^2$

$y+5 = (x-1)^2$

$y = (x-1)^2 - 5$

$\therefore \boxed{e(x) = (x-1)^2 - 5}$

but can only use the inherited domain (from the range of $f(x)$) which is $1 \leq x < \infty$

(b) $e(f(-4))$

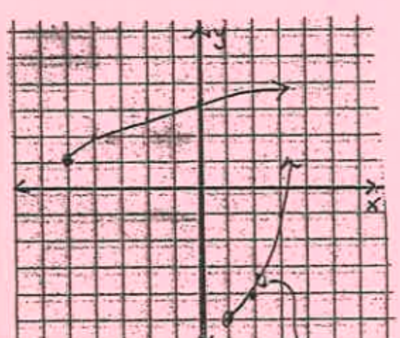
$f(-4) = 1 + \sqrt{-4+5}$
$= 1 + \sqrt{1} = 2$

$= (x-1)^2 - 5$

$= (2-1)^2 - 5 = -4$ same original input into $f(x)$

c) Their graphs would be reflections of each other across the line $y=x$

d)



$e(x)$ using only domain

$\boxed{5\text{-}63}$ $y+3=2^x$

$y=2^x$

a) $y=-2^x-3+3$

domain

$-3 < y < \infty$

which can also be written as $y > -3$

b) No lines of symmetry

c) y-intercept — Set $x=0$

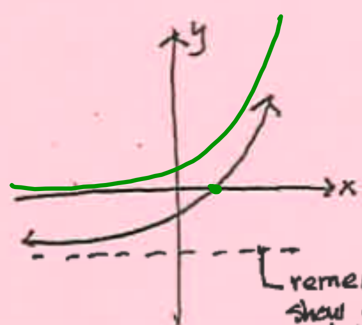
$y=2^0-3$
$=1-3$
$=-2$

$(0,-2)$

x-intercept — Set $y=0$

Use GDC

$(1.585, 0)$



remember to show asymptotes with vertical lines

d) to avoid x-intercepts, raise the graph above x-axis

$y+a=2^x$ where $a \leq 0$

5-66

(a) $x^2 - 49$

$= (x+7)(x-7)$

(b) $6x^2 + 48x$

$6x(x+8)$

c) $x^2 - x - 72$

$= (x-9)(x+8)$

d) $2x^3 - 8x$

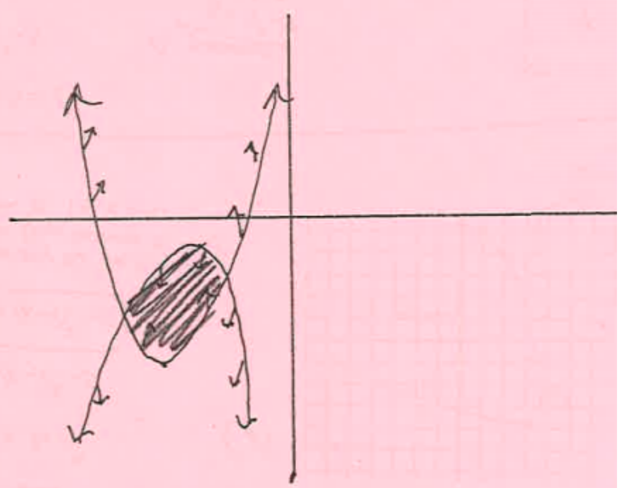
$= 2x(x^2-4)$

$= 2x(x+2)(x-2)$

5-67 sketch the solution to the System of Inequalities

$y \geq (x+5)^2 - 6$

$y \leq -(x+4)^2 - 1$



TODAY

Define a Logarithm

and

Convert back and forth between log and exponential form of an equation.

LAST CLASS

An Ancient Puzzle

more than 2000 years old.

5 - 57

Write down both the clues and the puzzles

Here are some clues to help you figure out how the puzzle works:

$\log_2 8 = 3 \quad \log_3 27 = 3$

$\log_5 25 = 2 \quad \log_{10} 10{,}000 = 4$

Additional clues

$\log_3 9 = 2 \qquad \log_7 49 = 2$

$\log_{10} 1000 = 3 \qquad \log_5 1 = 0$

exponent. function

$y = 3^x$

Now the inverse

$x = 3^y$

exponent

base

$y =$ the exponent of 3 to get x

exponent

$y = \log_3(x)$

Two Things to remember:

1. The base remains the same in both forms (in exponential form and log form)

2. A logarithm is an exponent
   (a logarithm produces an exponent)

exponent

$\log_2(32) = 5$ $\qquad$ $2^5 = 32$

base

log form $\qquad$ exponential form

$\log 2$

$\log_2 100$

Conversion Practice

Conversion Practice

Log form		Exponential form
$\log_3(x) = 5$	$\longrightarrow$	$x = 3^5$ $\quad 3^5 = x$
$2 = \log_7(m)$	$\longrightarrow$	$7^2 = m$
$4 = \log_n(6)$	$\longrightarrow$	$n^4 = 6$
$\log_n P = t$	$\longrightarrow$	$n^t = P$

$x = \log_3(1000) \quad \leftarrow \quad 3^x = 1000$

$\log_x(50) = 4 \quad \leftarrow \quad 50 = x^4$

$n = \log_4(1.23) \quad \leftarrow \quad 1.23 = 4^n$

$M = \log_A(R) \quad \leftarrow \quad A^M = R$

No calculator calculations

$\boxed{5-70}$

70

• in your NOTES

a) $\log_2(32) = D = 5$ $2^D = 32$

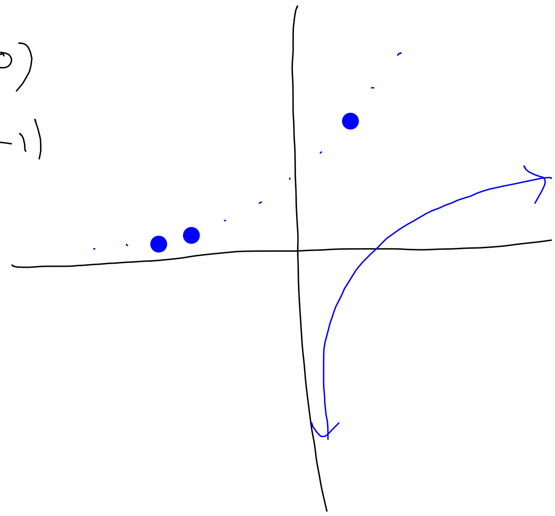
b) $\log_2\left(\frac{1}{2}\right) = B = -1$ $2^B = \frac{1}{2^1}$ $2^B = 2^{-1}$

c) $\log_2(4) = X = 2$ $2^X = 4$

d) $\log_2(0) = X$ $2^X = 0$

$\log(0)$

$\log(-1)$



Ⓔ $\log_2(?) = 3$ $\quad \underline{\underline{8}}$ answer $\quad$ because $2^3 = 8$

Ⓕ $\log_2(M?) = \frac{1}{2}$ $\quad \underline{\underline{\sqrt{2}}}$ answer $\quad$ because $2^{\frac{1}{2}} = M$

$\sqrt{2}$

Ⓖ $\log_2\left(\frac{1}{16}\right) = -4$ $\quad$ because $2^{-4} = \frac{1}{2^4} = \frac{1}{16}$

Ⓗ $\log_2(?) = 0$ $\quad \underline{\underline{1}}$ answer $\quad$ because $2^0 = 1$

$$x^{\frac{1}{5}} = \sqrt[5]{x}$$

See
LCQ

No cell phones when going over LCQ's or tests

"SS" means see the solutions.

B.B.

Strong Recommendation

- Read the Math Notes on page 233
- Copy down in your Notes

Assignment

Worksheet 5.2.2

Add the page 233 Math Notes to your notes.

mr c → pdf

b. Is the graph below a function ?

Is it's inverse a function ?