April 08, 2019

Find your new seat

Pick up the warm up and Hwk key

Check homework

See LCQ

No cell phones when going over LCQ's or tests

"SS" means see the solutions.

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

$x^2 + 6x = -2$

b-value is 6 → $\left(\frac{6}{2}\right)^2 = 9$

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

$(x+3)^2 = 7$

$\sqrt{\quad}$ $\sqrt{\quad}$

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

-3 -3

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

2. Add the rational expressions

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

LCD $(x-4)(x+1)$

$$\frac{3+6x-24}{(x-4)(x+1)}$$

~~$3(2x-7)$~~

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

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Willie's solution

$9 - x \leq 7$

$-9 \quad -9$

$-x \leq -2$

$-1 \quad -1$

$x \geq 2$

Nilly's solution

$9 - x \leq 7$

$+x \quad +x$

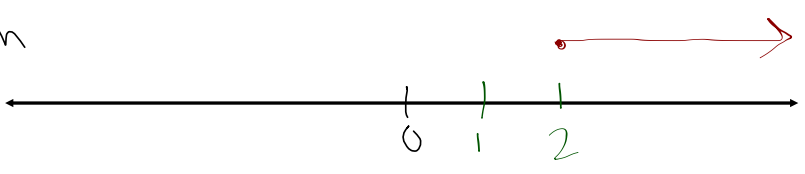
$9 \leq x + 7$

$-7 \quad -7$

$2 \leq x$

Solution:

its graph



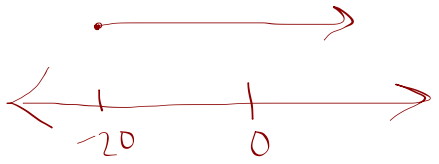
4. Now solve the inequality $\frac{4-x}{2} \leq 12$. Then graph on a number line.

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

$$4-x \leq 24$$
$$-4 \quad -4$$

$$-1(-x \leq 20)$$

$$x \geq -20$$



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

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

$(0-4)^3+6 \leq 0-4$

$(-4)^3+6 \leq -4$

Find the intersections

Boundary Points $x=2$

test pt $x=0$

$-64+6 \leq -4$

$-58 \leq -4$ ✓ yes $x=0$ is in the solution set

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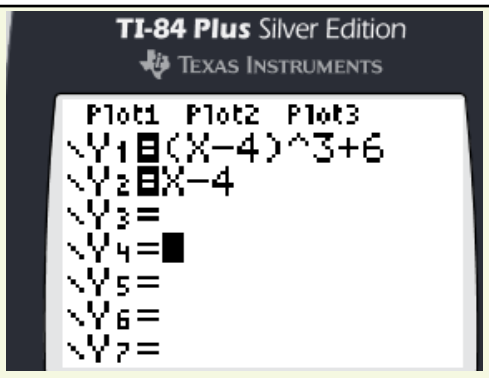
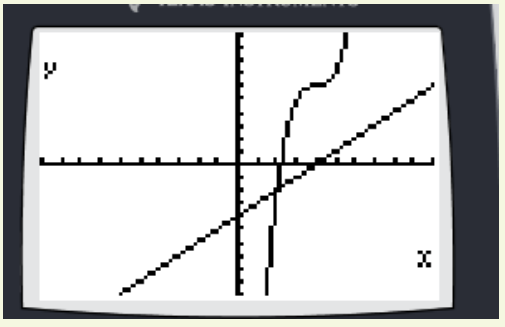
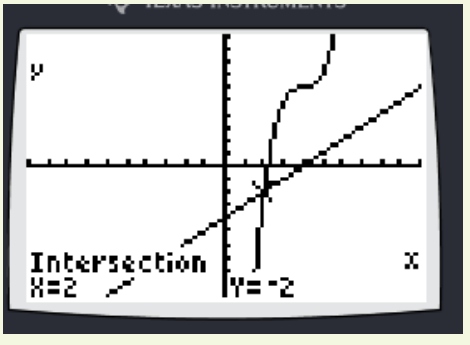
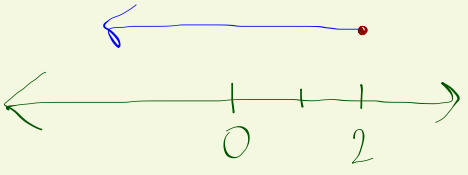






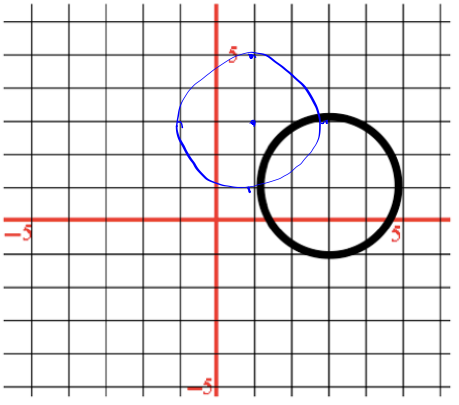


6. Find the inverse of $(x-3)^2+(y-1)^2 = 4$ and graph it.

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

$C(1,3)$

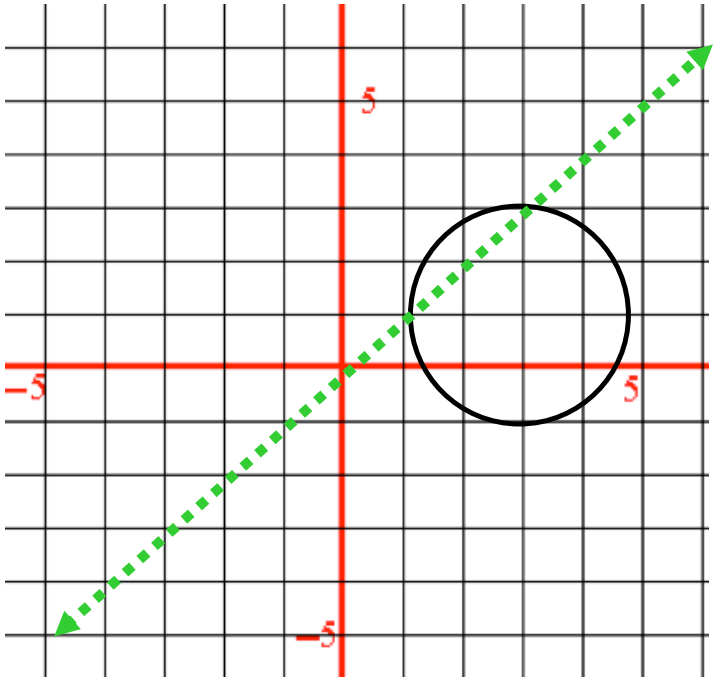
$r=2$



→

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

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



Example of work with excellent Qualities

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

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

$6x-5=685$

$6x=690$

$\boxed{x=115}$

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

$3x-1=0$ 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. $g(x) = (x-1)^2$ $\quad f(4) = 5(4)-3$

$g(3) = (3-1)^2$ $\quad \boxed{f(4) = 17}$

$g(3) = 4$

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

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

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

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

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

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

Schedule

Today 5.2.2 Day 1

Tues 5.2.2 Day 2

Wed Ch 5 Closure

Thurs Ch 5 Test

Friday 6.1.4

QUESTIONS ON HW

first look at # 60

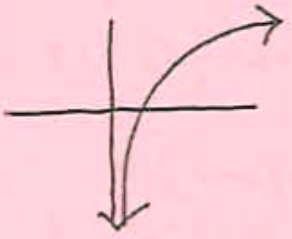
Alg 2 Solutions

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

inverse

$x = 3^y$

* 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

$0 < x < \infty$

or it can be written as $x > 0$

$-\infty < y < \infty$

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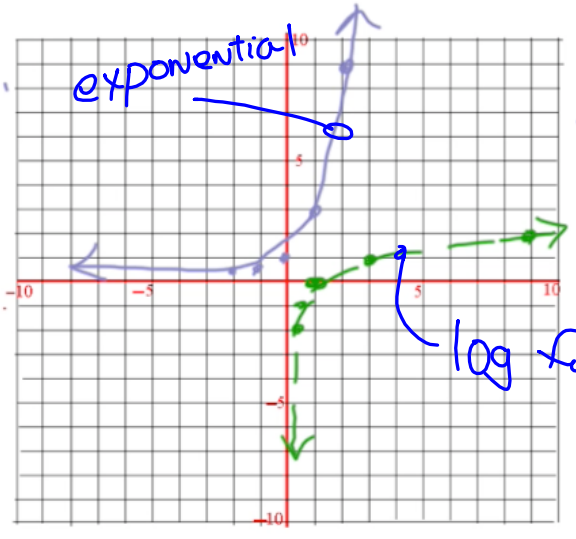
$y = 3^x$

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 $y=0$) $\Rightarrow$ $x = 3^0$

so, $x=1$

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

* Asymptotes

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

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) $g(3) = 2(3) + 5 = 11$

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

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

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

$-\infty < x < \infty,$

$x \neq 7$

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

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

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

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 $(\ )^2$

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

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

$\therefore$ $a(x) = (x-1)^2 - 5$

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

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

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

$= 1 + \sqrt{1} = 2$

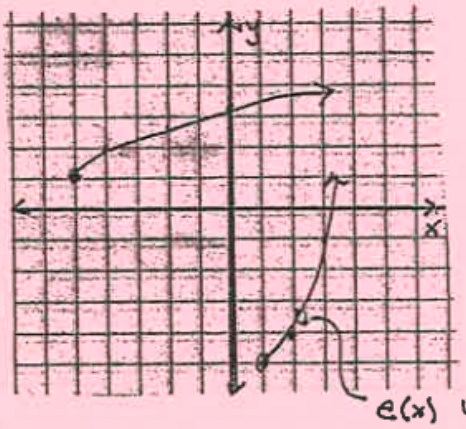
$= (x-1)^2 - 5$

$= (2-1)^2 - 5 = -4$

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

5-63 $y+3=2^x$

$y=2^x$

a) $y=2^x-3$

domain

$-3 < y < \infty$

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

b) No lines of symmetry

c) y-intercept — Set $x=0$

$y=2^0-3$

$=1-3$

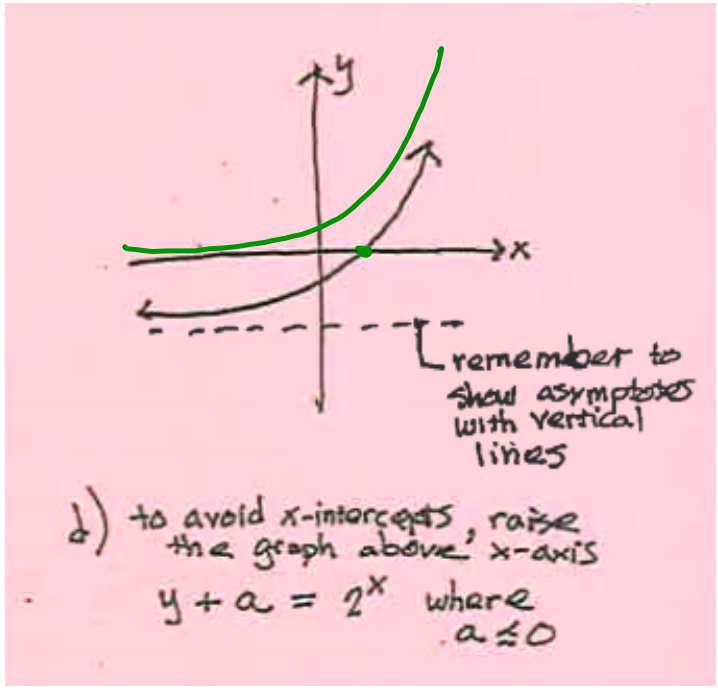
$=-2$

$(0,-2)$

x-intercept — Set $y=0$

Use GDC

$(1.585, 0)$


y
x
remember to show asymptotes with vertical lines
d) to avoid x-intercepts, raise the graph above x-axis
$y + a = 2^x$ where $a \geq 0$

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) $2x^3 - 8x$

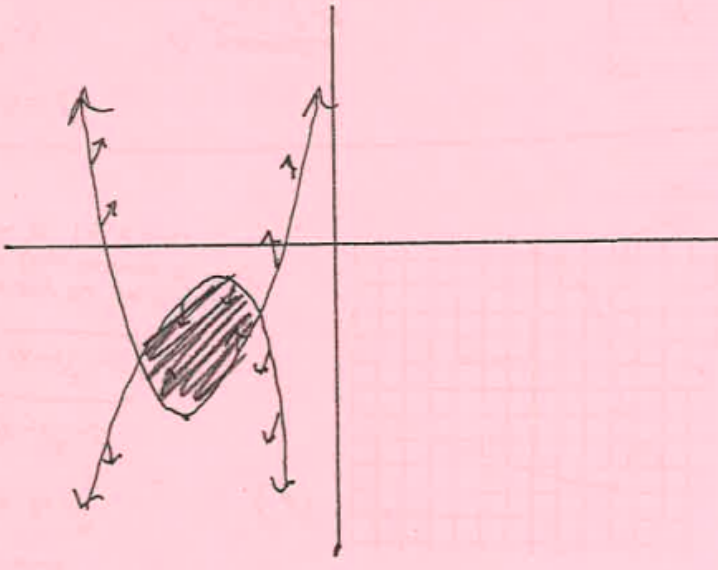
$= 2x(x^2-4)$

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

5-67 Sketch the solution to the System of Inequalities

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

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



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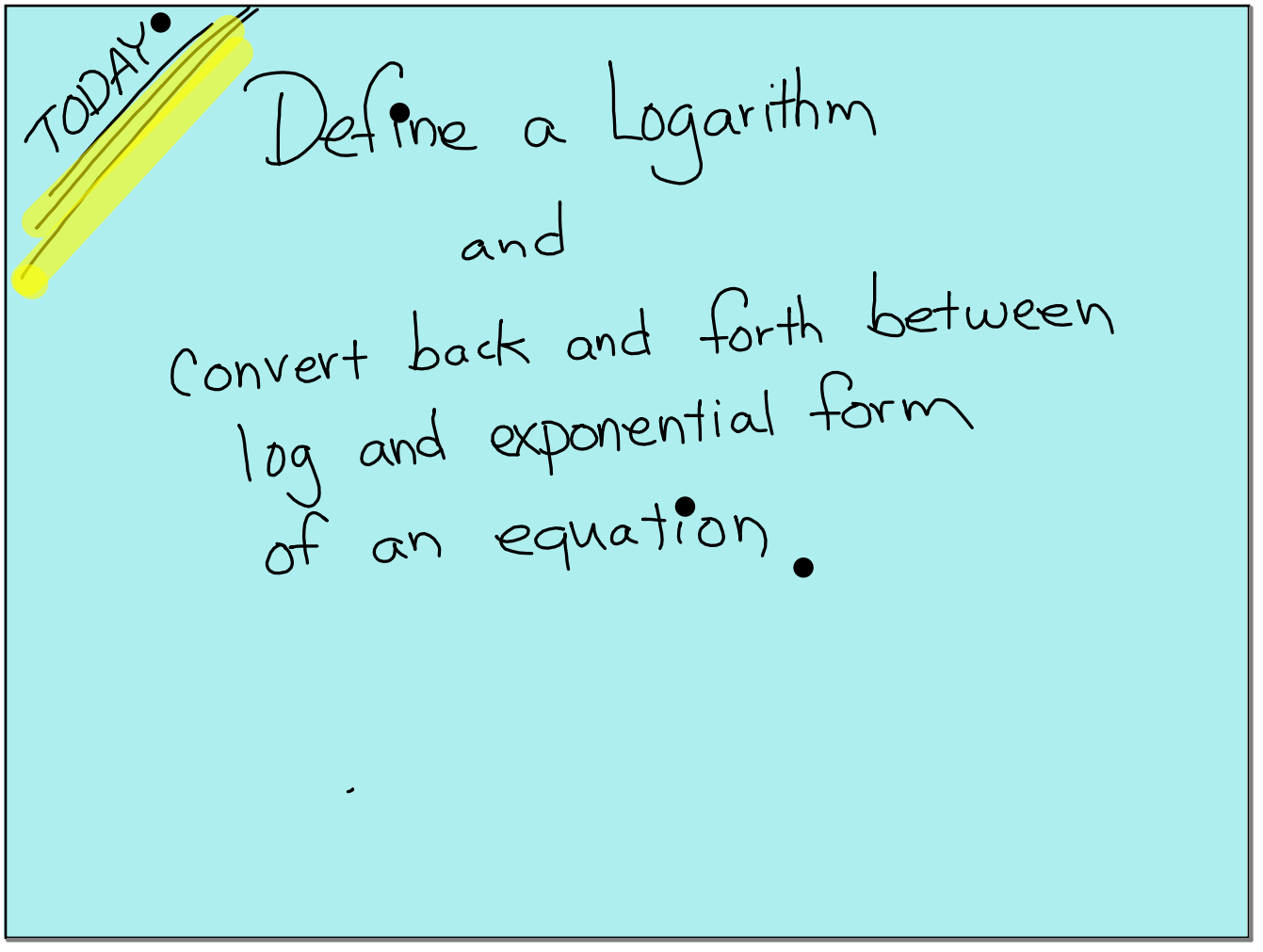

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LAST CLASS

An Ancient Puzzle

more than 2000 years old.

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

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

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

Additional Clues

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

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

Exponent. function

$y = 3^x$

Now the inverse

$x = 3^y$ (y: exponent; 3: base)

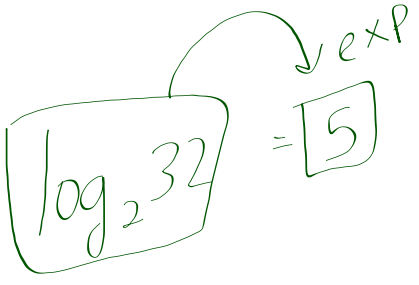
$y =$ the exponent of 3 to get x

$y = \log_3 x$ (y: exponent)

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)



base

log input

exponent

$\log_2(32) = 5$ ↔ $2^5 = 32$

equivalent

log form

exponential form

examples

convert $\log_8(x) = w$ → exponential form $8^w = x$

$3 = \log_{10}(n)$ $\quad 10^3 = n$

Convert back

exponential

$2000 = 5^x$

log form

$\log_5 2000 = x$

$16^{\frac{1}{2}} = 4$

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

$\sqrt{16} = 4$

$8^{\frac{2}{3}}$ ← exp, ↑ root $= \sqrt[3]{8^2}$

Conversion Practice

back and forth

Conversion Practice

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

$\log_3(1{,}000) = X \leftarrow 3^X = 1000$

$\log_X(50) = 4 \leftarrow 50 = X^4$

$\log_{\bullet}(1.23) = n \leftarrow 1.23 = 4^n$

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

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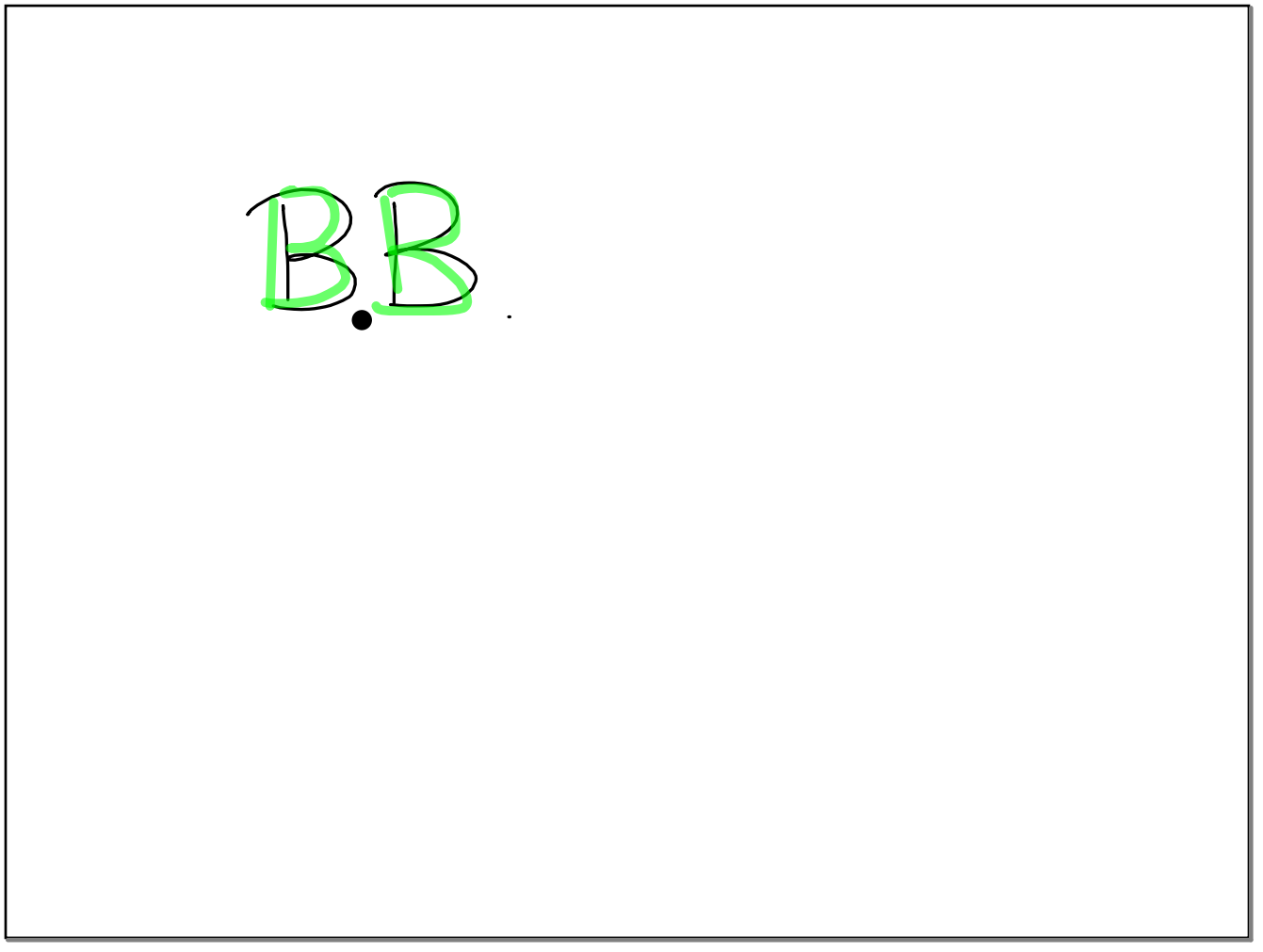
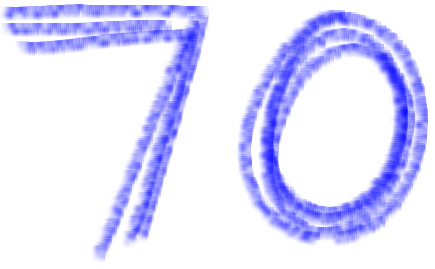


No calculator calculations



in your NOTES

(a) $\log_2(32) = 5$ because $2^{\square} = 32$

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

(c) $\log_2(4) = 2$ because $2^{\square} = 4$

(d) $\log_2(0) =$ und because $2^{\square} = 0$

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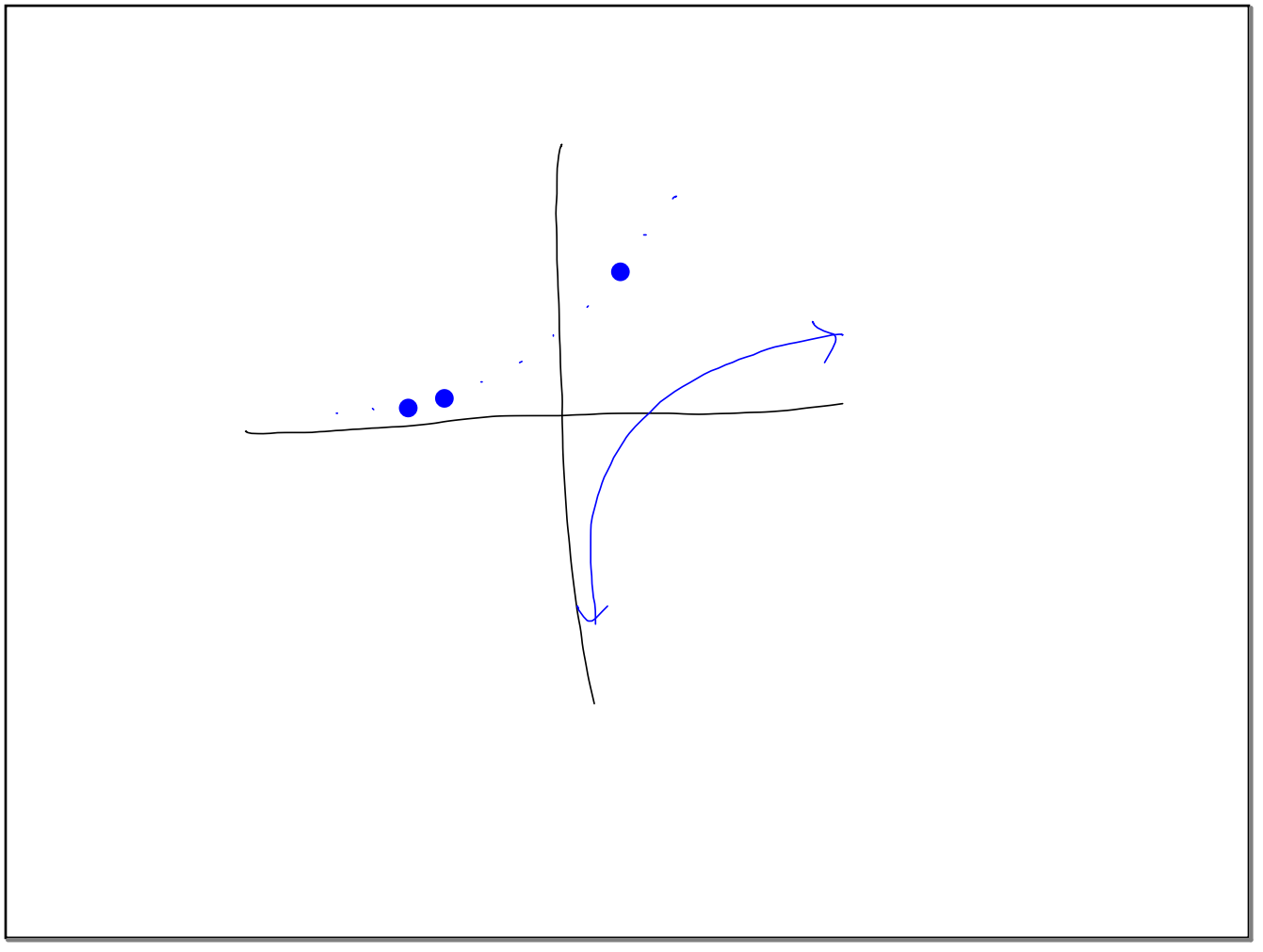


(e) $\log_2(?) = 3$ answer because

(f) $\log_2(?) = \frac{1}{2}$ answer because

(g) $\log_2\left(\frac{1}{16}\right) =$ because

(h) $\log_2(?) = 0$ answer because

Strong Recommendation

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

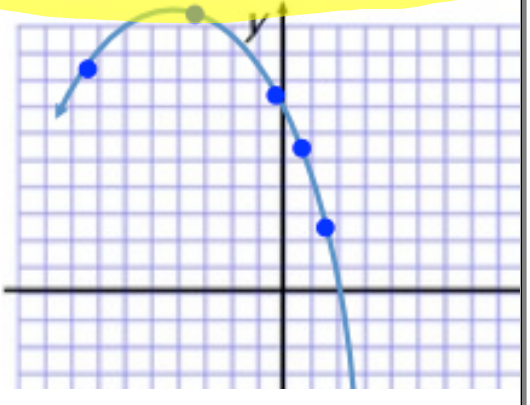
Assignment

Worksheet 5.2.2

Add the page 233 Math Notes to your notes.

b. Is the graph below a function ?

Is it's inverse a function ?



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