Homework Questions for 1.4

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Ready, Set, Go!

Ready

Topic: Properties of exponents

Use the product rule or the quotient rule to simplify. Leave all answers in exponential form with only positive exponents.

1. $3^6 \cdot 3^5$ 2. $2^3 \cdot 2^7$ 3. $7^2 \cdot 7^6$

4. $10^{-4} \cdot 10^7$ 5. $5^9 \cdot 5^{-6}$ 6. $p^2 p^5$ 7. $2^6 \cdot 2^{-3} \cdot 2^1$ 8. $b^{11} b^{-5}$

$2^{6+-3+1} = 2^4$

9. $\frac{7^5}{7^2}$ 10. $\frac{9^8}{9}$ 11. $\frac{3^5}{3^8}$ 12. $\frac{7^{-4}}{7^{-8}}$ 13. $\frac{p^{-3}}{p^5}$ 14. $\frac{x^7}{x^{-4}}$

$7+4$

X^{11}

Set

Topic: Inverse functions

15. Given the functions $f(x) = \sqrt{x} - 1$ *and* $g(x) = x^2 + 7$:

a. Calculate $f(16)$ *and* $g(3)$.

Sep 12-11:04 AM

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Match the function in the first column with its inverse in the second column.

$f(x)$	$f^{-1}(x)$
16. $f(x) = 3x + 5$	a. ~~$f^{-1} = \log_x 5$~~ $\log_5 x$
17. $f(x) = x^5$	b. $f^{-1} = \sqrt[3]{x}$
18. $f(x) = \sqrt[5]{x - 3}$	c. $f^{-1}(x) = \frac{x-5}{3}$
19. $f(x) = x^3$	d. $f^{-1}(x) = \frac{x}{3} - 5$
20. $f(x) = 5^x$	e. ~~$f^{-1} = \log_x 3$~~ $\log_3 x$
21. $f(x) = 3(x + 5)$	f. $f^{-1} = x^5 + 3$
22. $f(x) = 3^x$	g. $f^{-1} = \sqrt[5]{x}$

Go

Topic: Composite functions and inverses

Calculate $f(g(x))$ *and* $g(f(x))$ for each pair of functions.
(Note: the notation $(f \circ g)(x)$ *and* $(g \circ f)(x)$ mean the same thing as $f(g(x))$ *and* $g(f(x))$, respectively.)

23. $f(x) = 2x + 5$ $g(x) = \frac{x-5}{2}$	24. $f(x) = (x + 2)^3$ $g(x) = \sqrt[3]{x} - 2$

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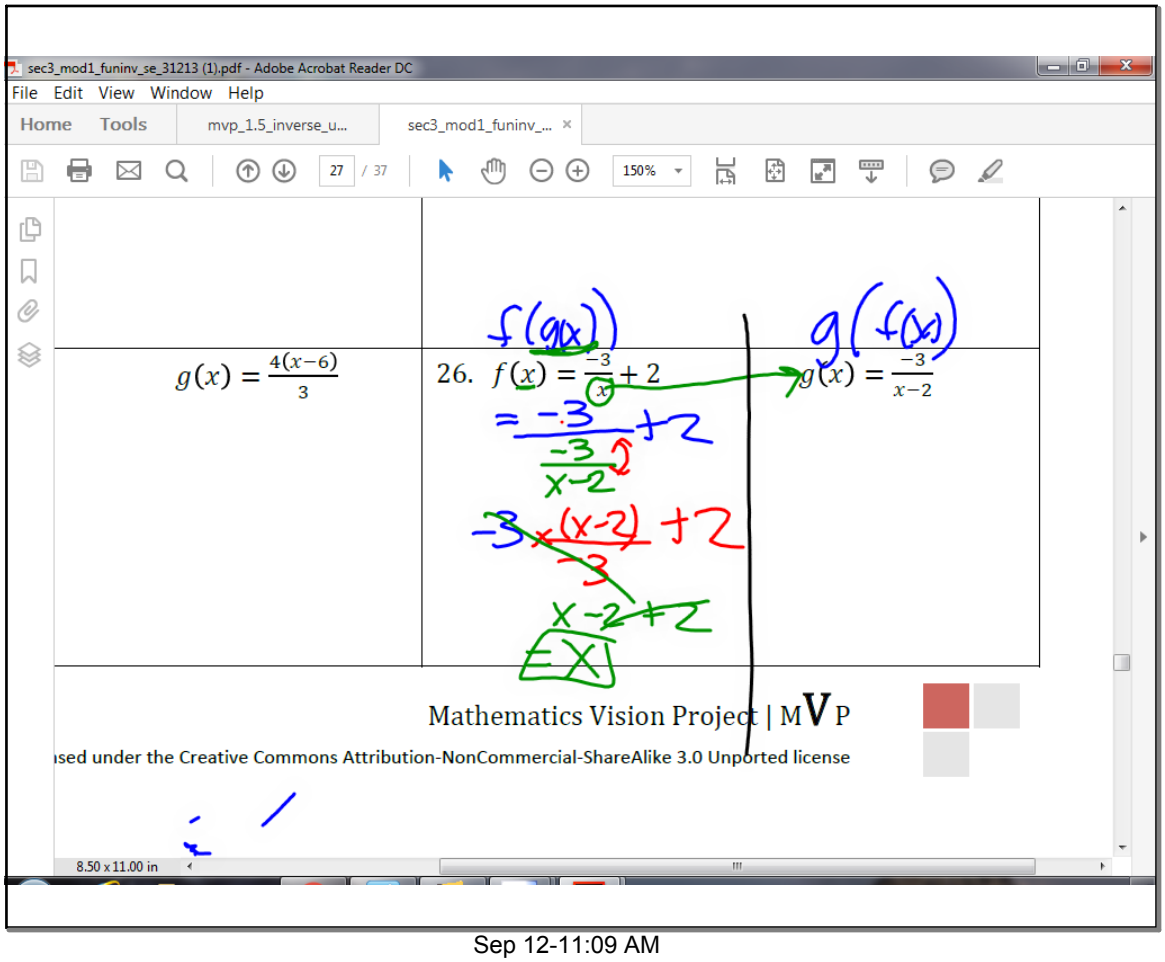

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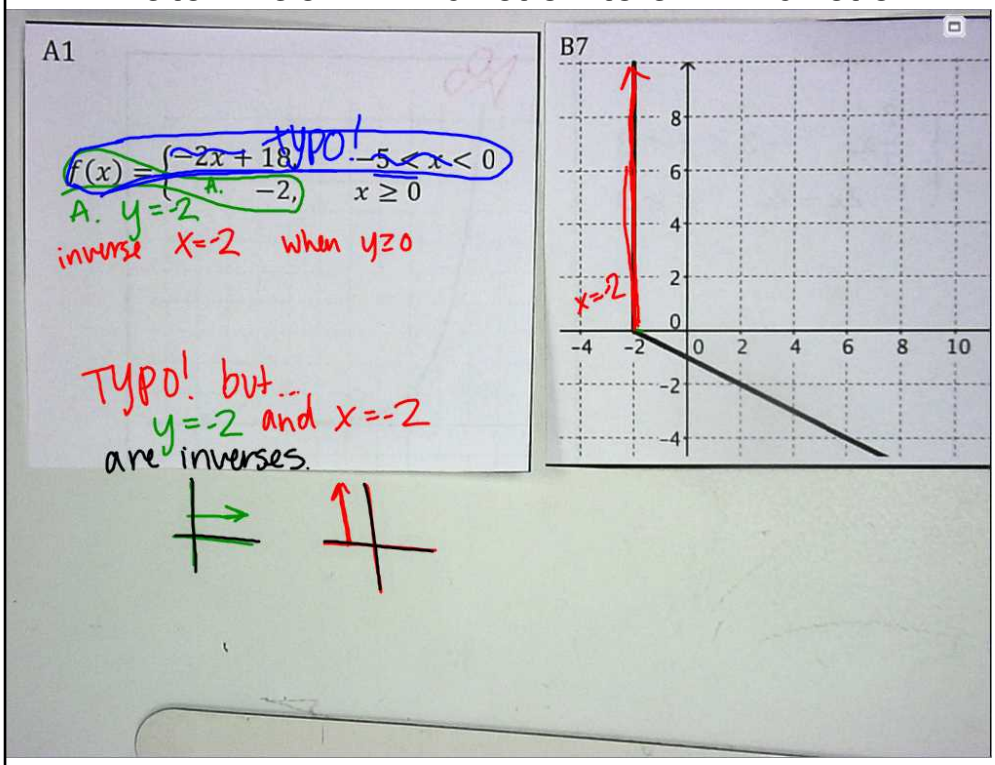
Lesson 1.5 Inverse Universe:

Match Each 'A' Function to a 'B' Function



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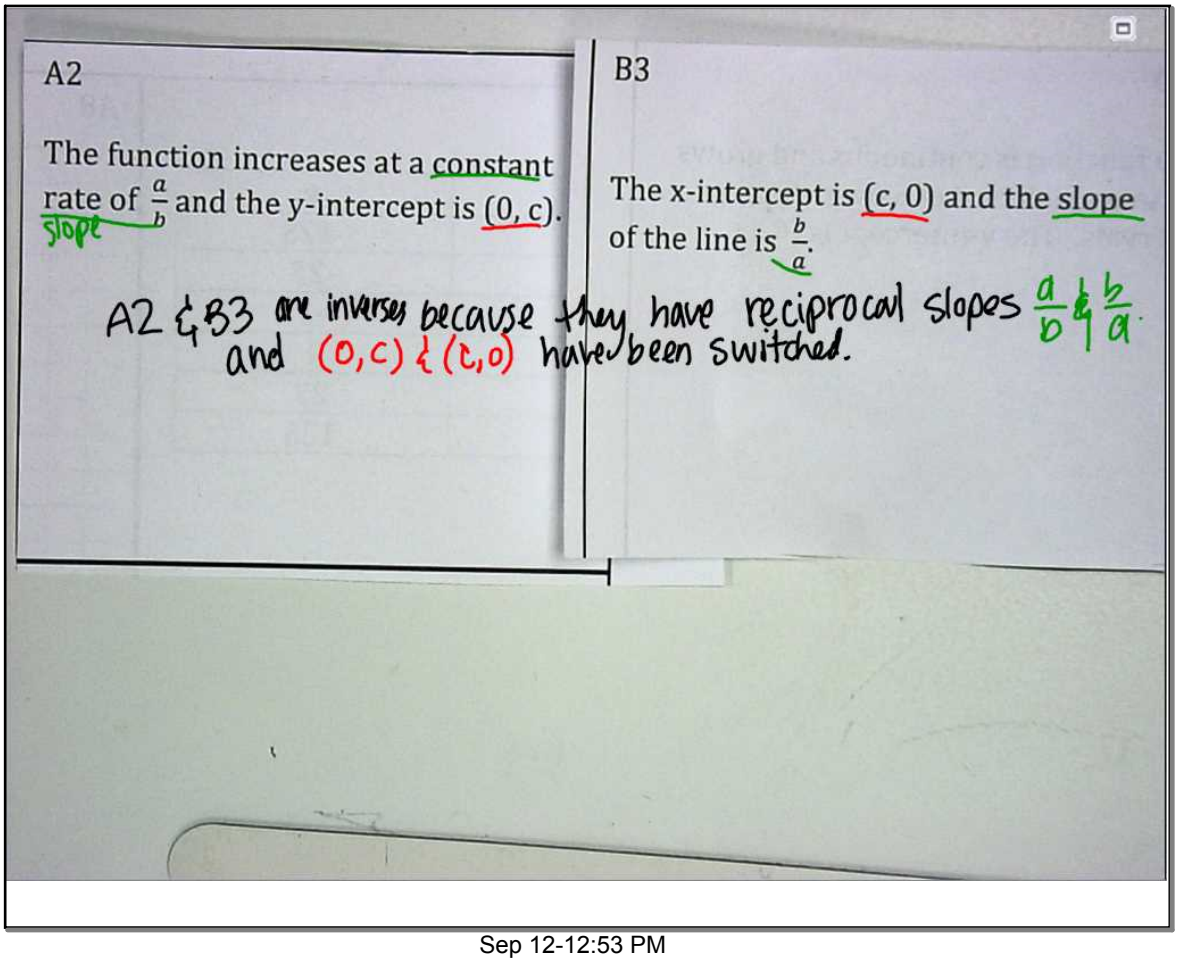

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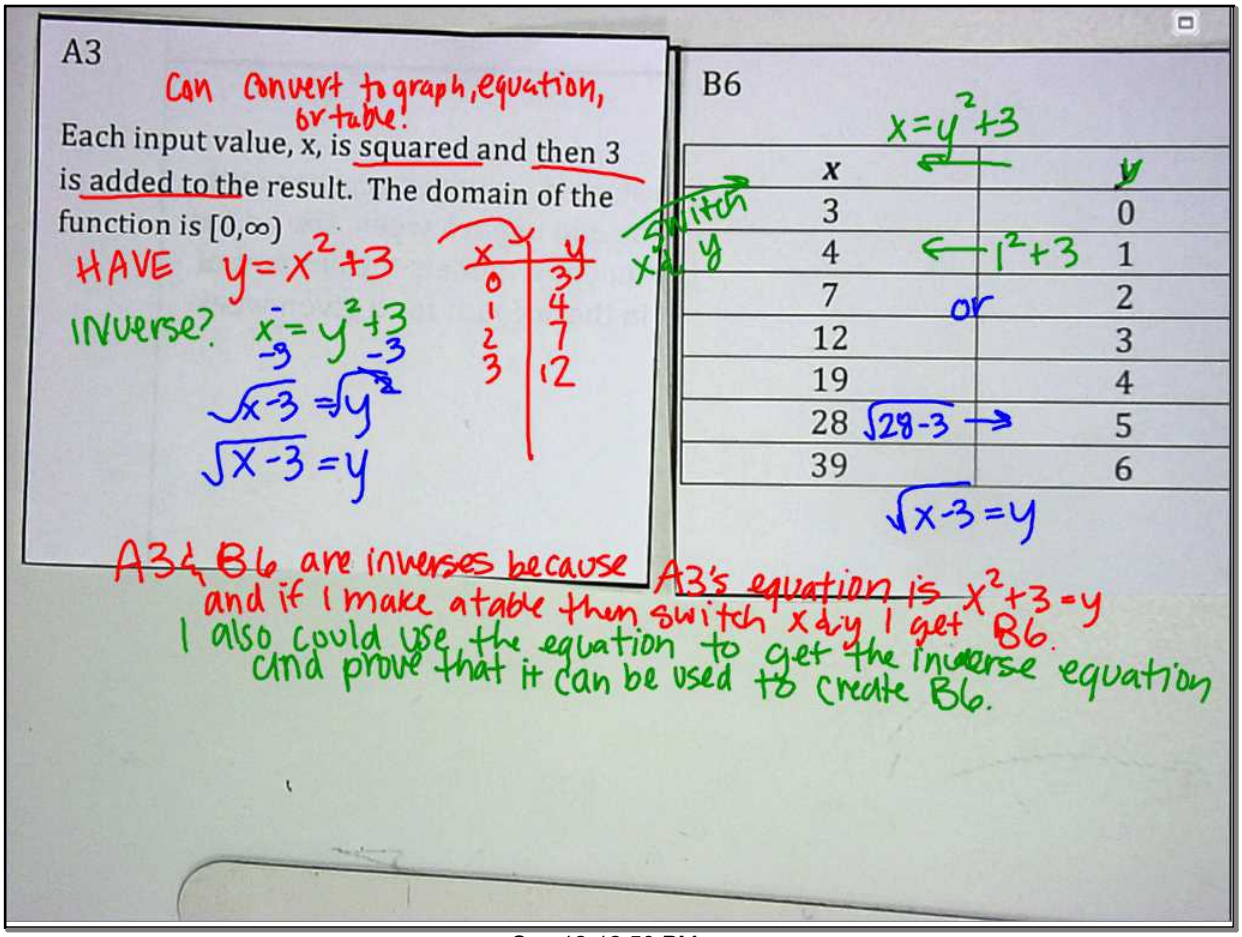

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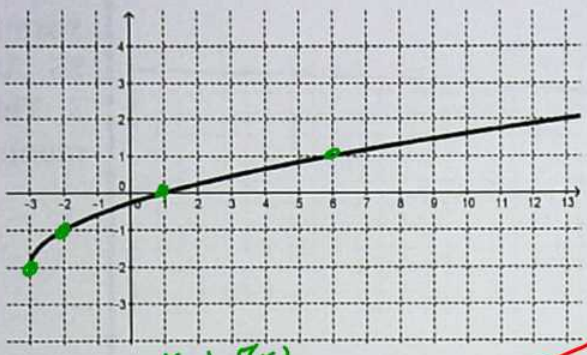
A4



x	f(x)
-3	-2
-2	-1
1	0
6	1

B8

x	y
-2	-3
-1	-2
0	1
1	6
2	13

switch x & y

A4 & B8 are a match because if you use some points from the graph and switch x & y then you get the table in B8.

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A5

HAVE

	x	in order	y
not in order	-2	-3	-3
	2	-2	3
	0	0	0
	6	3	5
	4	4	4
	$\frac{-4}{3}$	5	-2

(make inverse table

WANT in inverse

-3	-2
-2	$-\frac{4}{3}$
0	0
3	2
4	4
6	5

$-3 < x < 3$ so use $y = \frac{2}{3}x$

$y = \frac{2}{3}(-2) = -\frac{4}{3}$ ✓

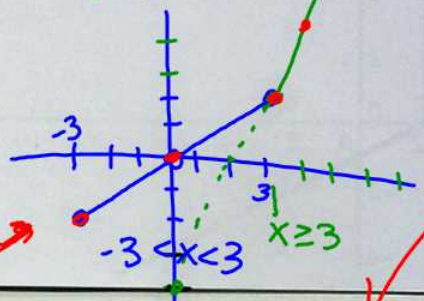
$x \geq 3$ so use $y = 2x - 4$

$y = 2(4) - 4 = 4$ ✓

B2

$$f(x) = \begin{cases} y = \frac{2}{3}x + 0 & -3 < x < 3 \\ y = 2x - 4, & x \geq 3 \end{cases}$$

rise / run; between



A5 & B2 match because if you switch x & y in the table those points are on the graph and the equats are true @ those points.

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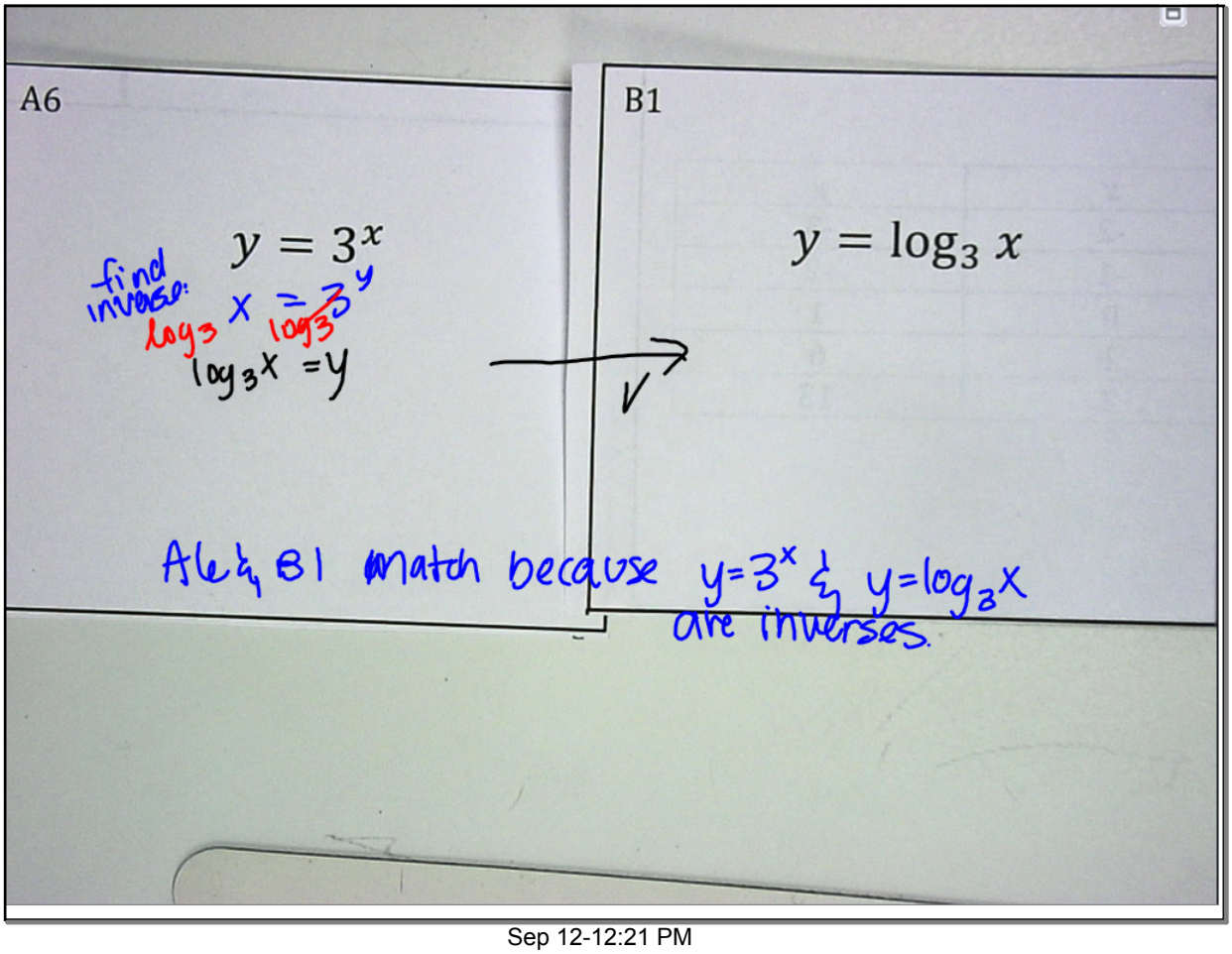

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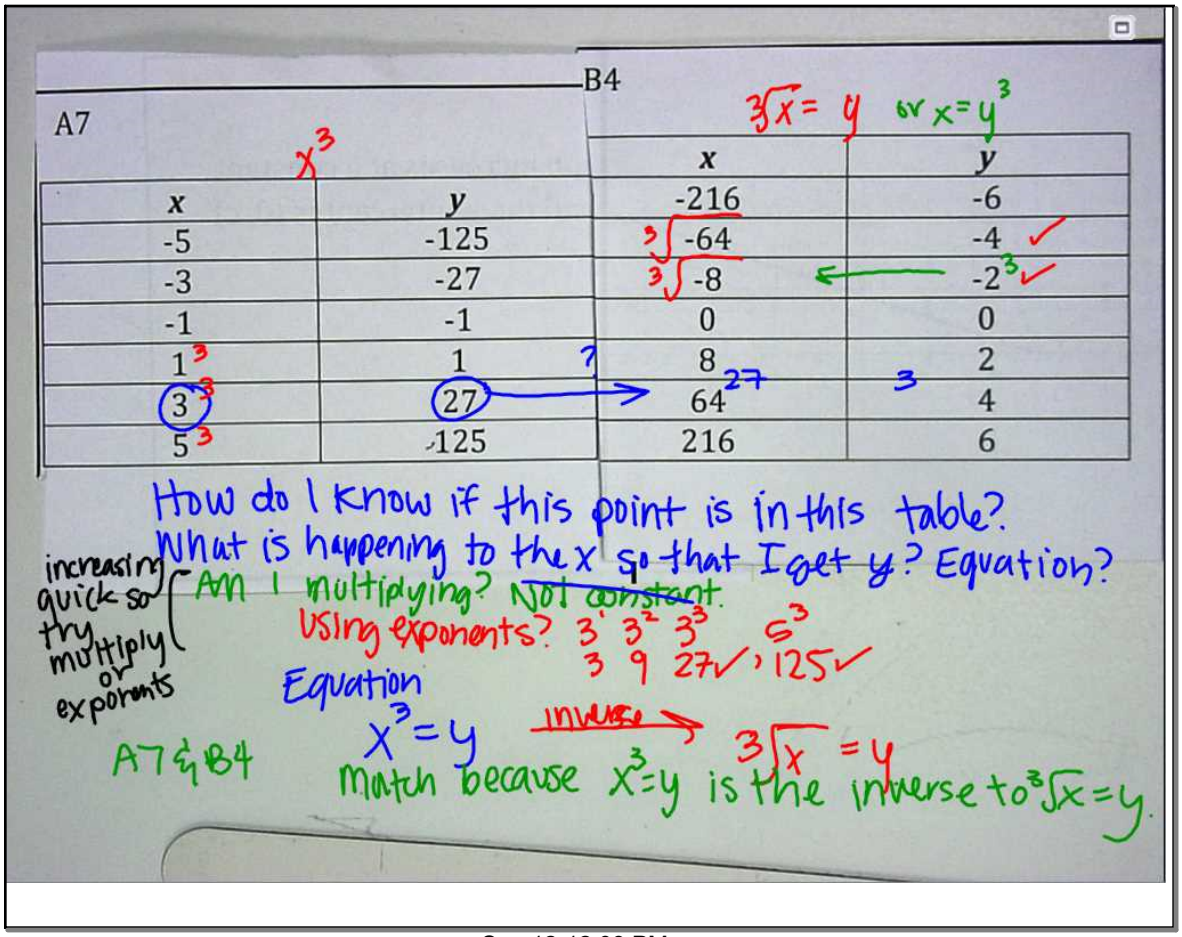

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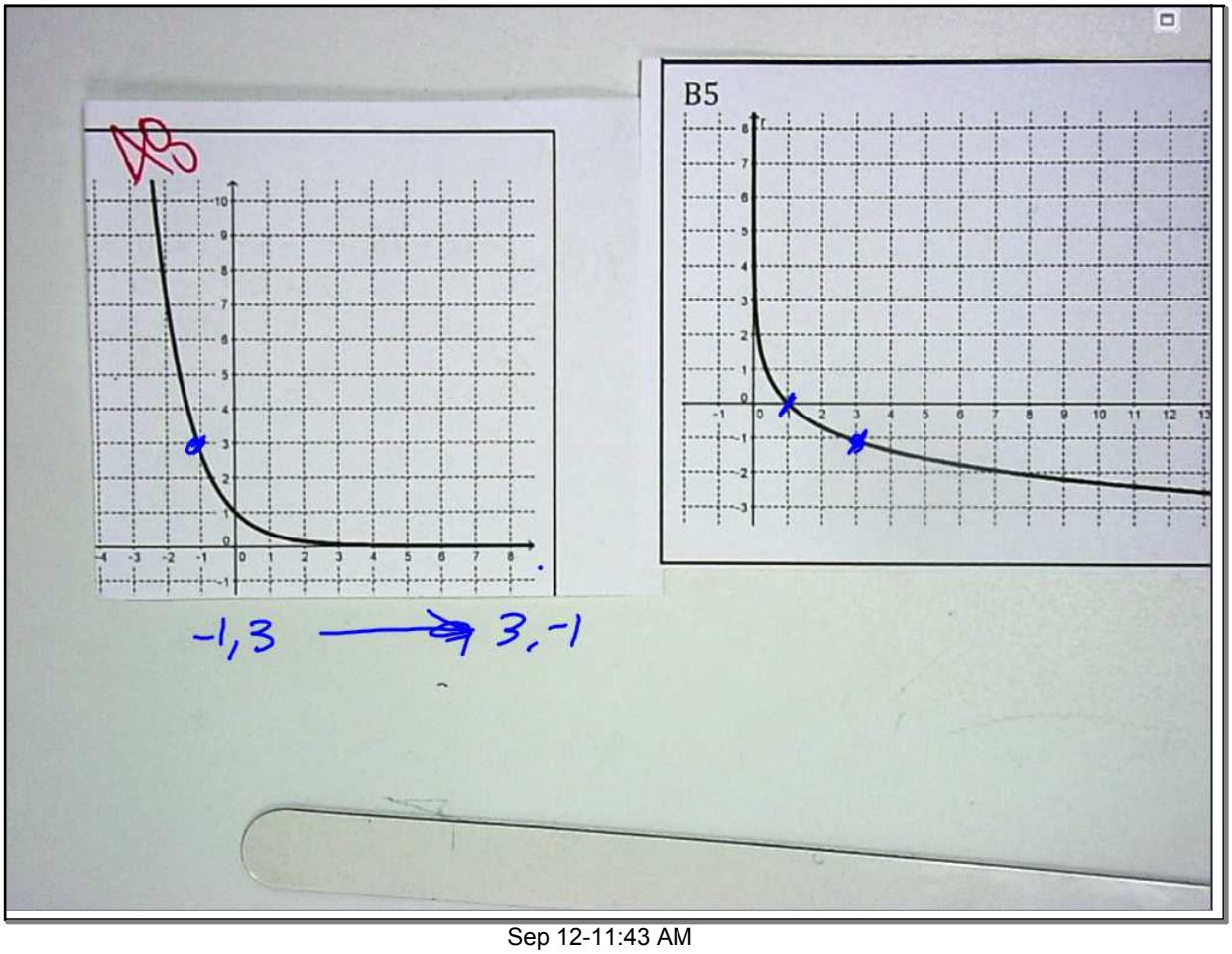

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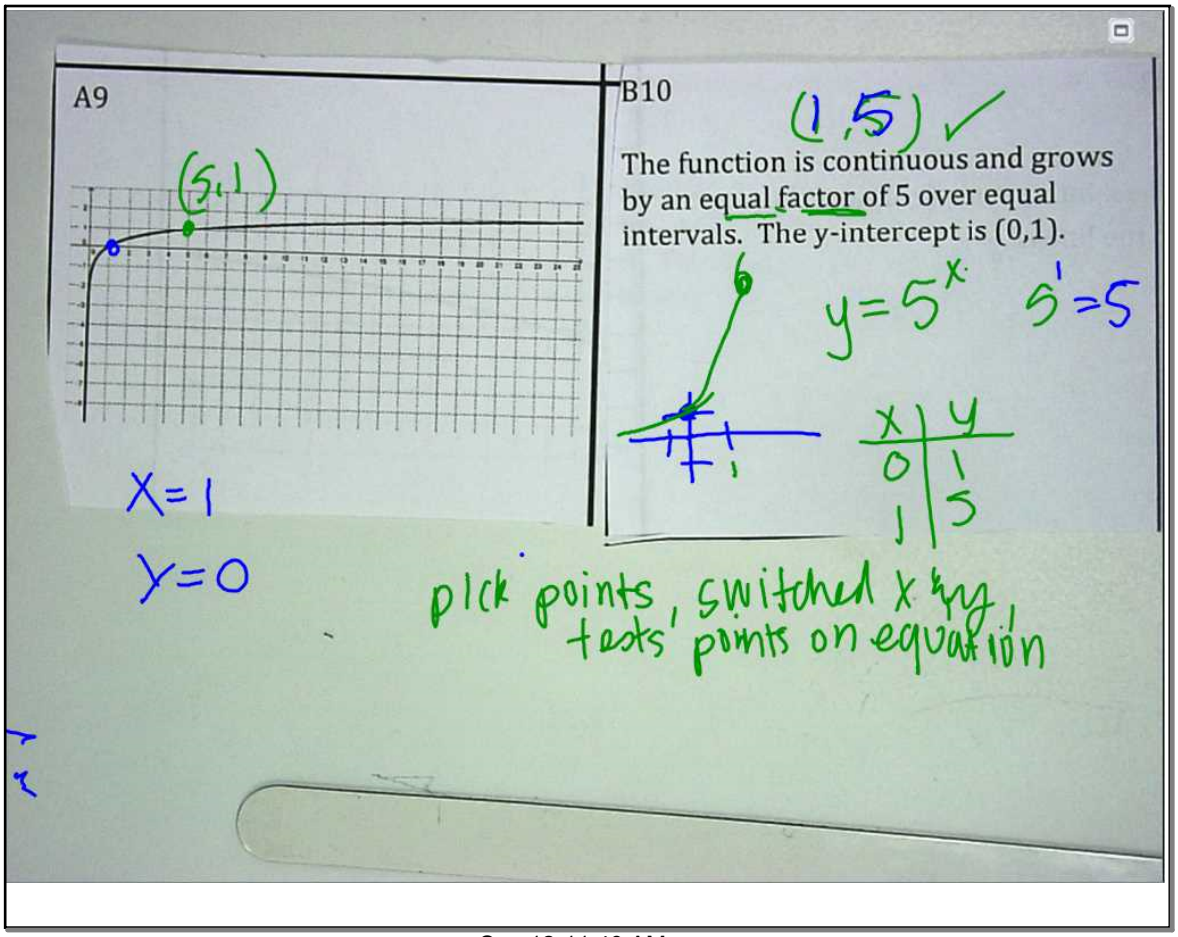

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A10 HAVE

Yasmin started a savings account with $5. At the end of each week, she added 3. This function models the amount of money in the account for a given week.

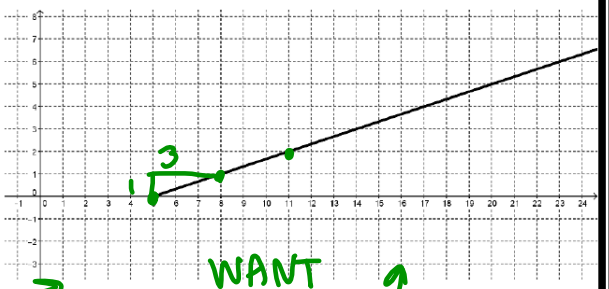
x	y
0	5
1	8
2	11

+3

$y = 5 + 3x$

switch table

B9



WANT

x	y
5	0
8	1
11	2

check

A10 & B9 are inverses because A10 describes a table which matches the table of the graph in B9 (with x & y switched)

Sep 12-8:46 PM

Homework Help 1.5

exponents.

1. $\sqrt[7]{x^2} \cdot \sqrt[7]{x^3}$

*remember $\sqrt{x} = x^{1/2}$, $\sqrt[3]{x} = x^{\frac{1}{3}}$, $\sqrt[n]{x} = x^{\frac{1}{n}}$

2. $\sqrt[3]{x} \cdot \sqrt[4]{x} \cdot \sqrt[6]{x}$

change so each are the same base each is a factor of 2.

3. $\sqrt[6]{a} \cdot \sqrt[3]{a^2} \cdot \sqrt[5]{b^3}$

4. $\sqrt[5]{32} \cdot \sqrt{9} \cdot \sqrt[3]{27}$

get common denominator

$3\left(\frac{3}{4}\right) + \left(\frac{4}{3}\right) + \left(\frac{1}{6}\right)^2$

$\frac{9}{12} + \frac{16}{12} + \frac{2}{12} = \frac{27}{12} = \frac{9}{4}$

#5 $\sqrt[4]{8} \cdot \sqrt[3]{16} \cdot \sqrt[6]{2}$

$\sqrt[4]{2^3} \cdot \sqrt[3]{2^4} \cdot \sqrt[6]{2^1}$

$2^{\frac{3}{4}} \cdot 2^{\frac{4}{3}} \cdot 2^{\frac{1}{6}}$

$2^{\frac{9}{4}}$

6. $(5^2)^3$

7. $(7^2)^{-1}$

8. $(3^{-4})^{-5}$

#8 $(3^{-4})^{-5}$

or just -4×-5

$3^{-4} \cdot 3^{-4} \cdot 3^{-4} \cdot 3^{-4} \cdot 3^{-4} = \frac{1}{3^{-20}}$

$= 3^{20}$

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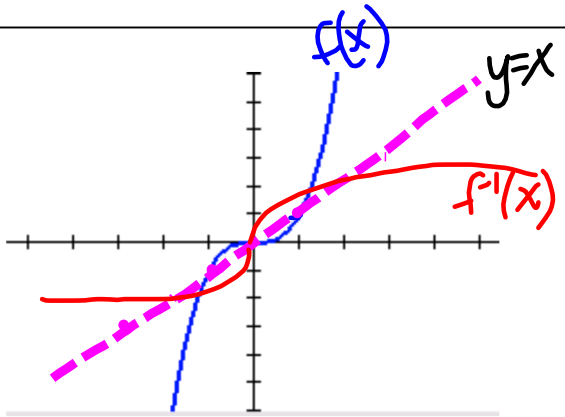
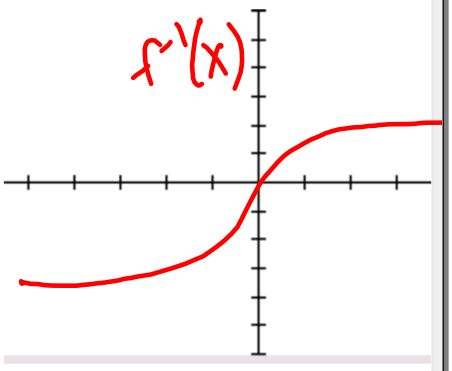
find the INVERSE

12. $f(x) = -2x + 4$	
13. $f(x) = log_3 x$	
14. 	

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Topic: Composite functions

Calculate $f(g(x))$ *and* $g(f(x))$ for each pair of functions.
(Note: the notation $(f \circ g)(x)$ *and* $(g \circ f)(x)$ mean the same thing, respectively.)

16. $f(x) = 3x + 7;\ g(x) = -4x - 11$

17. $f(x) = -4x + 60;\ g(x) = -\frac{1}{4}x + 15$

18. $f(x) = 10x - 5;\ g(x) = \frac{2}{5}x + 3$

19. $f(x) = -\frac{2}{3}x + 4;\ g(x) = -\frac{3}{2}x + 6$

$f(g(x)) = -\frac{2}{3}\left(-\frac{3}{2}x + 6\right) + 4$

$x - 4 + 4$

$= x$

$g(f(x)) = -\frac{3}{2}\left(-\frac{2}{3}x + 4\right) + 6$

$1x - 6 + 6$

$= x$

√ Inverses

20. Look back at your calculations for $f(g(x))$ *and* $g(f(x))$. Two of the pairs of equations are inverses of each other. Which ones do you think they are?

Why?

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