Test 2 Review

In CLASS

Oct 10-9:07 PM

Sec 3 Test 2 Review
Logarithmic Functions

1. Put these logarithmic expressions in order from smallest to largest by writing the *letter* that corresponds with each expression in the spaces below.

$2^{4}=16$ $9^{1}=9$ $2^{-5}=\frac{1}{32}$ $8^{0}=1$ $3^{3}=27$

(A) $\log_2 16$ (B) $\log_9 9$ (C) $\log_2 \frac{1}{32}$ (D) $\log_8 1$ (E) $\log_3 27$

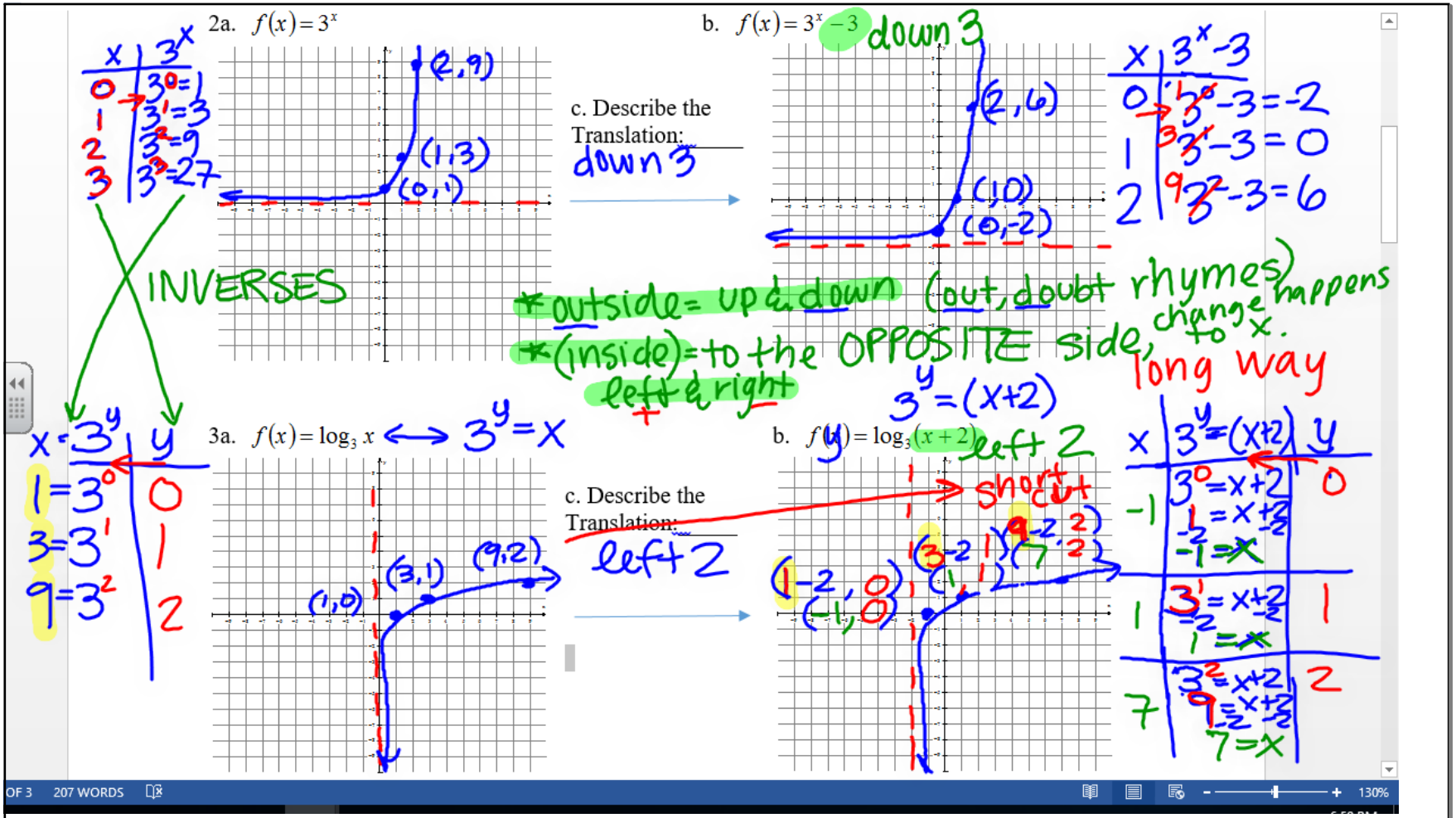
C / −5 D / 0 B / 1 E / 3 A / 4

Smallest ⟶ Largest

Graph the following functions. Mark and label at least two points on each graph.

2a. $f(x)=3^x$

b. $f(x)=3^x-3$


2a. $f(x)=3^x$
b. $f(x)=3^x-3$
down 3
c. Describe the Translation:
down 3
INVERSES
*outside = up & down (out, doubt rhymes)
*(inside) = to the OPPOSITE side, happens
left & right
change to x.
long way
3a. $f(x)=\log_3 x \leftrightarrow 3^y=x$
b. $f(x)=\log_3(x+2)$
$3^y=(x+2)$
left 2
c. Describe the Translation:
left 2
shortcut
OF 3
207 WORDS
130%

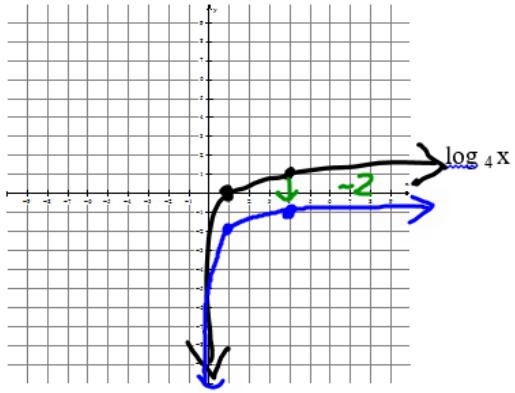
Graph Translations: ***Use properties of logarithms to expand and simply each expression completely then graph the translations, shifting ALL POINTS.***

Celia Gubler is signed in

4.a. $f(x) = \log_4 \frac{x}{16}$ $4^{[2]} = 16$

$= \log_4 x - \log_4 16^2$

b. Describe the translation to $\log_4 x$ −2, down 2

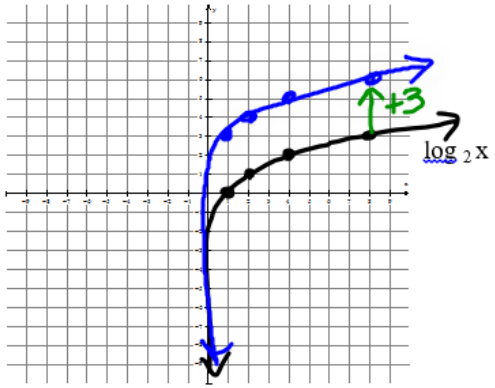


5.a. $f(x) = \log_2(8x)$ $2^{[3]} = 8$

$= \log_2 8 + \log_2 x$

$= 3$

b. Describe the translation to $\log_2 x$ +3, up 3

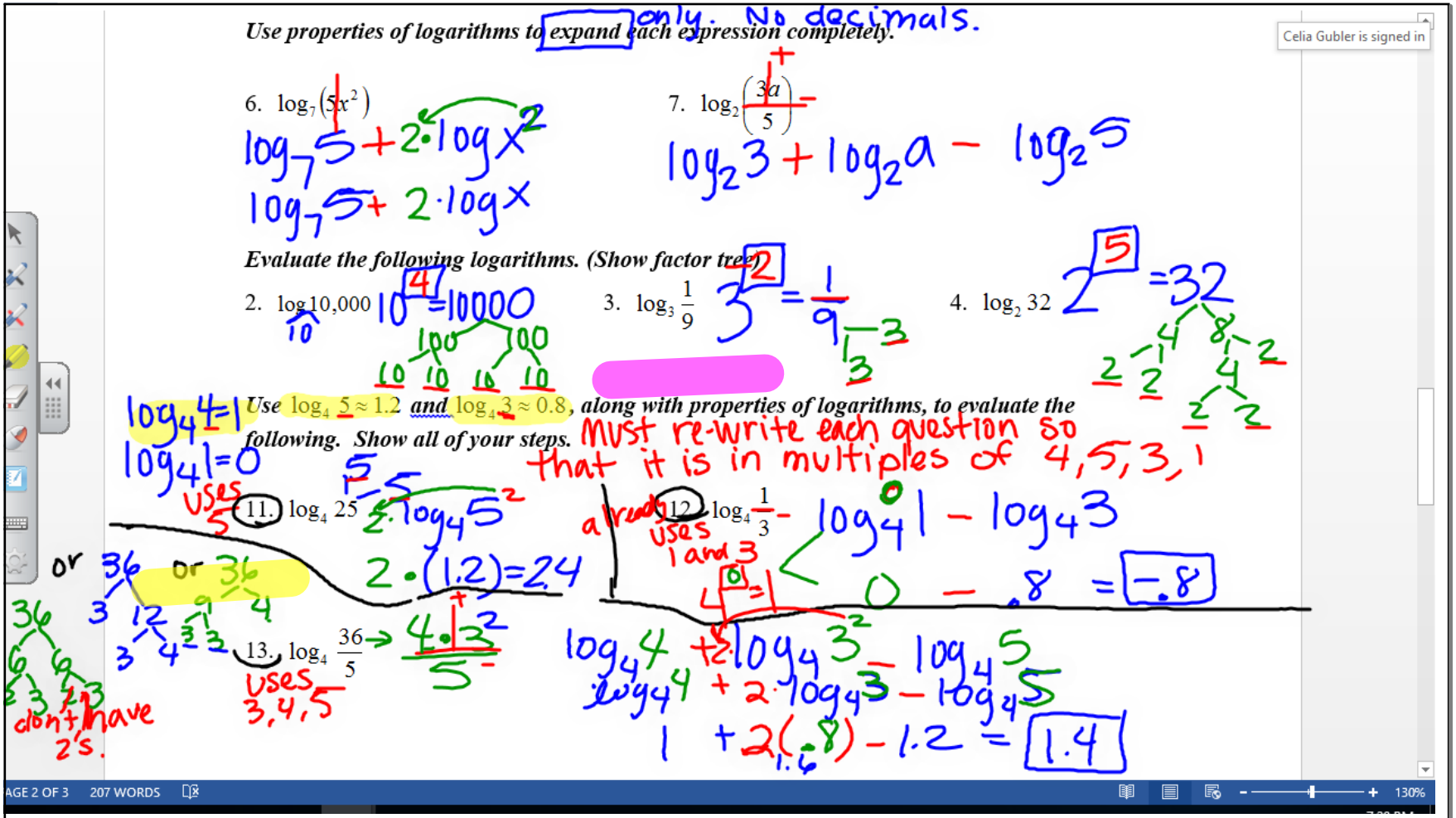


Use properties of logarithms to expand each expression completely.

6. $\log_7(5x^2)$

7. $\log_2\left(\frac{3a}{5}\right)$

207 WORDS 130%


Use properties of logarithms to expand each expression completely. only. No decimals.
Celia Gubler is signed in
6. $\log_7(5x^2)$
$\log_7 5 + 2\cdot\log x$
7. $\log_2\left(\frac{3a}{5}\right)$
$\log_2 3 + \log_2 a - \log_2 5$
Evaluate the following logarithms. (Show factor tree)
2. $\log 10{,}000$
3. $\log_3 \frac{1}{9}$
4. $\log_2 32$
Use $\log_4 5 \approx 1.2$ and $\log_4 3 \approx 0.8$, along with properties of logarithms, to evaluate the following. Show all of your steps.
Must re-write each question so that it is in multiples of 4, 5, 3, 1
11. $\log_4 25$
12. $\log_4 \frac{1}{3}$
13. $\log_4 \frac{36}{5}$
$\log_4 4 + 2\cdot\log_4 3 - \log_4 5$
$1 + 2(.8) - 1.2 = 1.4$
$0 - .8 = -.8$
$2\cdot(1.2) = 2.4$
don't have 2's.
Uses 3, 4, 5
Uses 1 and 3
PAGE 2 OF 3
207 WORDS
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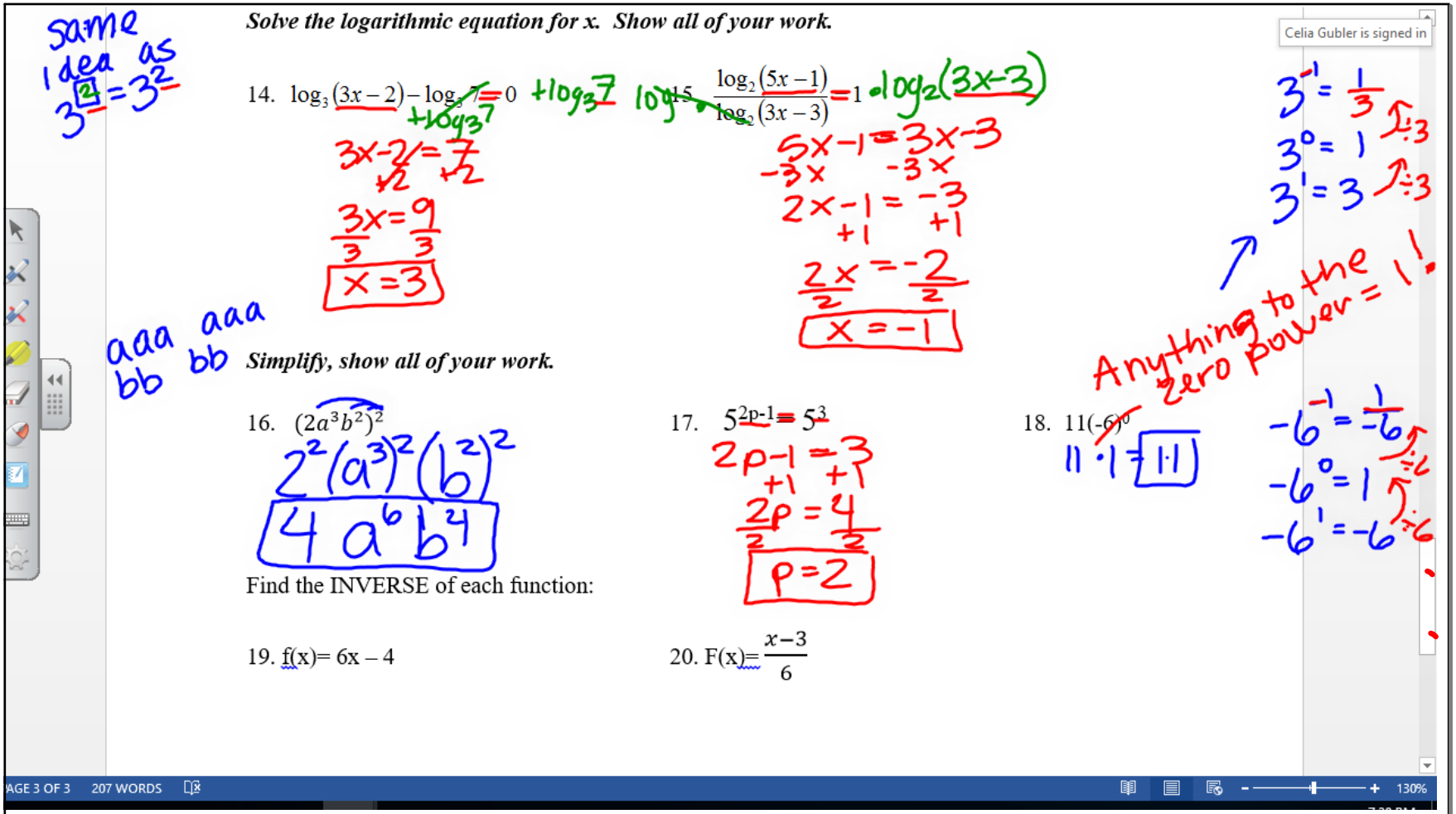
Solve the logarithmic equation for x. Show all of your work.
Celia Gubler is signed in
same idea as
$3^2 = 3^2$
14. $\log_3(3x-2) - \log_3 7 = 0$
$+\log_3 7$
$3x-2=7$
$+2 \quad +2$
$\frac{3x}{3} = \frac{9}{3}$
$x = 3$
$\log \frac{\log_2(5x-1)}{\log_2(3x-3)} = 1$
$\cdot \log_2(3x-3)$
$5x-1 = 3x-3$
$-3x \quad -3x$
$2x-1 = -3$
$+1 \quad +1$
$\frac{2x}{2} = \frac{-2}{2}$
$x = -1$
$3^{-1} = \frac{1}{3}$
$3^0 = 1$
$3^1 = 3$
$\div 3$
Anything to the zero power = 1!
aaa aaa
bb bb
Simplify, show all of your work.
16. $(2a^3b^2)^2$
$2^2(a^3)^2(b^2)^2$
$4a^6b^4$
17. $5^{2p-1} = 5^3$
$2p-1 = 3$
$+1 \quad +1$
$\frac{2p}{2} = \frac{4}{2}$
$p = 2$
18. $11(-6)^0$
$11 \cdot 1 = 11$
$-6^{-1} = \frac{1}{-6}$
$-6^0 = 1$
$-6^1 = -6$
$\div 6$
Find the INVERSE of each function:
19. f(x)= 6x – 4
20. $F(x) = \frac{x-3}{6}$
PAGE 3 OF 3
207 WORDS
130%

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Find the INVERSE of each function:

1. switch x & y 2. solve for y

19. $f(x) = 6x - 4$

$x = 6y - 4$

$+4 \quad +4$

$\frac{x+4}{6} = \frac{6y}{6}$

$\frac{x+4}{6} = y$ or $\frac{x}{6} + \frac{4}{6} = y$

20. $f(x) = \frac{y-3}{6}$

$6 \cdot x = y - 3$

$6x = y - 3$

$+3 \quad +3$

$6x + 3 = y$

21. Given $f(x)=3x+11$ and $g(x)=\frac{x-11}{3}$. Show f(g(x)) and answer if they are inverses.

f(x) ← g(x) inside, replace x with the equation for g(x).

$f(g(x)) = 3\left(\frac{x-11}{3}\right)+11$

$x = x$

X INVERSES!

*side note

$f(x) = 3x + 11$

$g(x) = \frac{x-11}{3}$

What happens to x?

·3 then +11

−11 then ÷3

INVERSES Reverses!

Test 2 Review

HOMEWORK

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corresponds with each expression in the spaces below.

(A) $\log_2 2$ (B) $\log_5 625$ (C) $\log_9 \frac{1}{81}$ (D) $\log_4 1$ (E) $\log_3 243$

C D A B E

-2 0 1 4~3.. 5

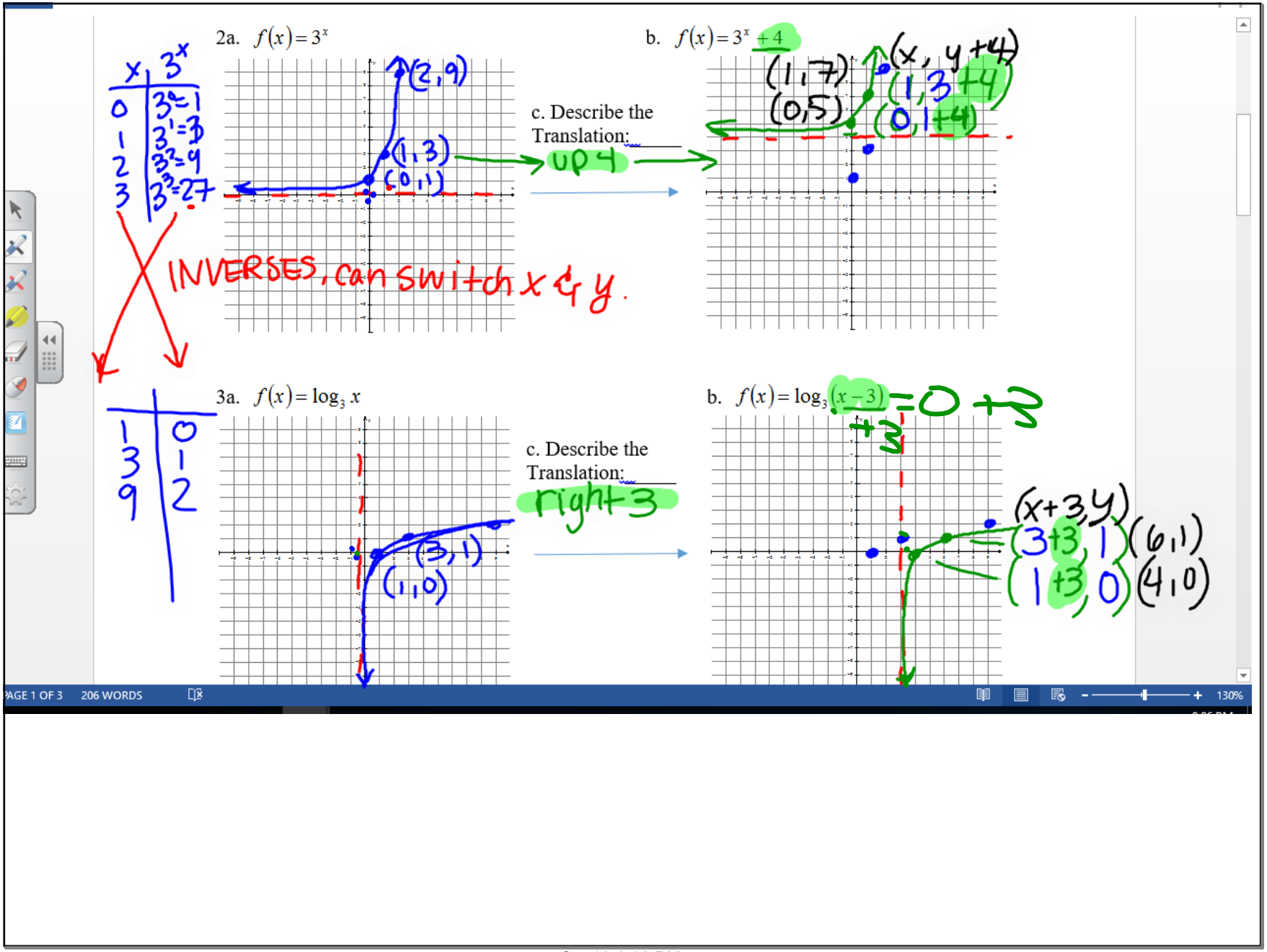
Smallest → Largest

Graph the following functions. ***<u>Mark and label at least two points on each graph</u>.***

2a. $f(x) = 3^x$

b. $f(x) = 3^x + 4$

c. Describe the Translation:


2a. $f(x)=3^x$
x | 3^x
0 | $3^0=1$
1 | $3^1=3$
2 | $3^2=9$
3 | $3^3=27$
(2,9)
(1,3)
(0,1)
INVERSES, can switch x & y.
c. Describe the Translation:
up 4
b. $f(x)=3^x+4$
(1,7)
(0,5)
(x, y+4)
(1,3+4)
(0,1+4)
3a. $f(x)=\log_3 x$
1 | 0
3 | 1
9 | 2
(3,1)
(1,0)
c. Describe the Translation:
right 3
b. $f(x)=\log_3(x-3)$
+3=0+3
(x+3,y)
(3+3,1) (6,1)
(1+3,0) (4,0)
PAGE 1 OF 3
206 WORDS
130%

Graph Translations: ***Use properties of logarithms to* expand *and* simply *each expression completely then graph the translations, shifting ALL POINTS.***

4.a. $f(x) = \log_4 \frac{x}{4}$

$= \log_4 x - \log_4 4$

-1

$4^{[1]} = 4$

b. Describe the translation to $\log_4 x$ -1, down 1

5.a. $f(x) = \log_2 (16x)$

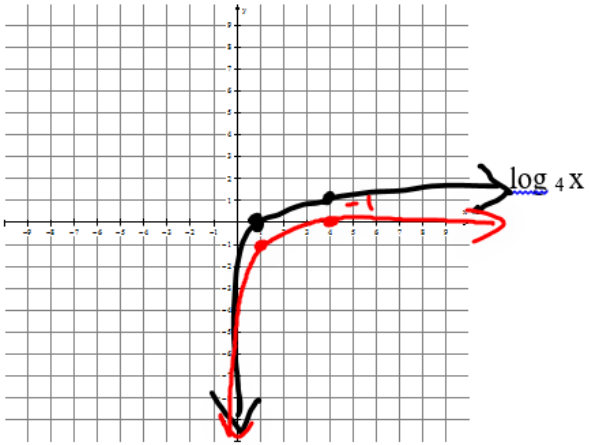
$= \log_2 16 + \log_2 x$

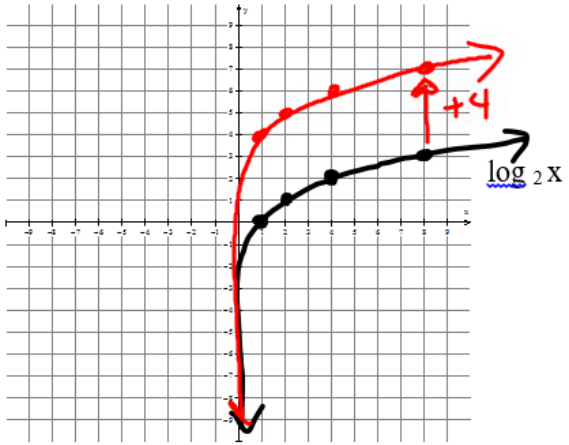
4

$+$

$2^{[4]} = 16$ $4 \cdot \frac{1}{4} = 1$

b. Describe the translation to $\log_2 x$ $+4$, up 4





Use properties of logarithms to expand each expression completely.

E 2 OF 3 206 WORDS 150%

Use properties of logarithms to expand each expression completely.

6. $\log_7(8x^3)$ $\log_7 8 + 3\log_7 x$

7. $\log_2\left(\frac{6x}{5}\right)$ $\log_2 6 + \log_2 x - \log_2 5$

Evaluate the following logarithms. (Show factor tree)

8. $\log 1000$ $10^3 = 1000$ $= 3$

9. $\log_3 \frac{1}{81}$ $3^{-4} = \frac{1}{81}$ $= -4$

10. $\log_4 64$ $4^3 = 64$ $= 3$

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

Use $\log_4 5 \approx 1.2$ *and* $\log_4 3 \approx 0.8$, *along with properties of logarithms, to evaluate the following. Show all of your steps.*

rewrite using multiples of 1, 3, 4, 5

EXPAND

11. $\log_4 15$ $\log_4(3 \cdot 5)$ $\log_4 3 + \log_4 5$ $.8 + 1.2 = 2$

12. $\log_4 \frac{1}{9}$ $\log_4 3^{-2}$ $-2(.8) = -1.6$

13. $\log_4 \frac{45}{4}$ $\log_4 \frac{3^2 \cdot 5}{4}$ $= \log_4 3^2 + \log_4 5 - \log_4 4$ $2(.8) + 1.2 - 1$ $1.6 + 1.2 - 1 = 1.8$

45 = 9 · 5, 9 = 3 · 3; 45 = 15 · 3, 15 = 3 · 5

PAGE 2 OF 3 206 WORDS 130%

Solve the logarithmic equation for x. Show all of your work.

14. $\log_3(x+3)-\log_3 9=0$

$+\log_3 9$

$+\log_3 9$

$\log_3(x+3)=\log_3 9$

$x+3=9$

$-3\quad -3$

$\boxed{x=6}$

15. $\dfrac{\log_2(6x+2)}{\log_2(4x+4)}=1$

$\log_2(4x+4)$

$\log_2(6x+2)=\log_2(4x+4)$

$6x+2=4x+4$

$-4x\quad -4x$

$2x+2=4$

$-2\quad -2$

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

$x=2$

$\boxed{x=1}$

aaaaaa bbb

aaaaaa bbb

3·3

Simplify, show all of your work.

16. $(3a^6b^3)^2$

$3^2(a^6)^2(b^3)^2$

$\boxed{9a^{12}b^6}$

17. $5^{3p-2}=5^7$

$3p-2=7$

$+2\quad +2$

$\frac{3p}{3}=\frac{9}{3}$

$\boxed{p=3}$

18. $25(8^2)^0$

$25\cdot 1=25$

ANYTHING to the zero power = 1.

Find the INVERSE of each function:

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1. switch x & y 2. Solve for y.

19. f(x)= 7x – 2

$x = 7y - 2$

$+2 \quad +2$

$\frac{x+2}{7} = \frac{7y}{7}$

$\frac{x+2}{7} = y$ or $\frac{x}{7} + \frac{2}{7} = y$

20. $f(x) = \frac{y-5}{4}$ $4 \cdot x = \frac{y-5}{4} \cdot 4$

$4x = y - 5$

$+5 \quad +5$

$4x + 5 = y$

21. Given f(x)=5x-12 and g(x)= $\frac{x+12}{5}$. Show f(g(x)) and answer if they are inverses.

$f(x) = 5x - 12$

$f(g(x)) = 5\left(\frac{x+12}{5}\right) - 12$

$x + 12 - 12$

$= x$ INVERSES

f(x) g(x) inside, replace x with equation g(x).

*Notice what happens to x?

$f(x) = 5x - 12$: ·5 then −12

$g(x) = \frac{x+12}{5}$: +12 then ÷5

Inverses reverse!

← must show that way.

3 OF 3 206 WORDS 170%

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Oct 11-8:23 AM