

Name \_\_\_\_\_ Date \_\_\_\_\_ Per \_\_\_\_\_

**Show all the work clearly to receive full credit.**

Use  $y = \log_3(x+2)$  for problems 1 - 5

- 1) Graph it.  
Fill in a table of values or graph by translation.
- 2) Find the domain.
- 3) Find the range.
- 4) Find the y-intercept (if any).
- 5) Describe the end-behavior.

x	y
-1.76	-3
-1.89	-2
-1.67	-1
-1	0
1	1
7	2
25	3

4)  $y = \log_3(0+2); 3^2 = 2; y \log 3 = \log 2$

$y = \frac{\log 2}{\log 3} \approx 0.63$  (Round to 4 decimal places)

Solve:

6)  $\log_4(3x-2) = 3$

7)  $e^{x-3} = 9$

$4^3 = 3x-2$

$(x-3) \ln e = \ln 9$

$\log 4 = 3x-2$

$x-3 = \ln 9$

$\log 6 = 3x$

$x = \ln 9 + 3$

$22 = x$

$x \approx 5.1972$

8)  $2 \log_6 4 - \frac{1}{3} \log_6 8 = \log_6 x$

9)  $\log_4(2a-2) = \log_4(a^2-5)$

$\log_6 16 - \log_6 2 = \log_6 x$

$2a-2 = a^2-5$

$\log_6 \frac{16}{2} = \log_6 x$

$0 = a^2 - 2a - 3$

$8 = x$

$0 = (a-3)(a+1)$

$a = 3$  or  ~~$a = -1$~~

10)  $\log_5 125 = 2x$

(Round to 4 decimal places)

$5^{2x} = 125$

11)  $3^{2x} = 4^{x-3}$

$5^{2x} = 5^3$

$\log 3^{2x} = \log 4^{x-3}$

$2x = 3$

$x = \frac{3}{2}$

$2x \log 3 = (x-3) \log 4$

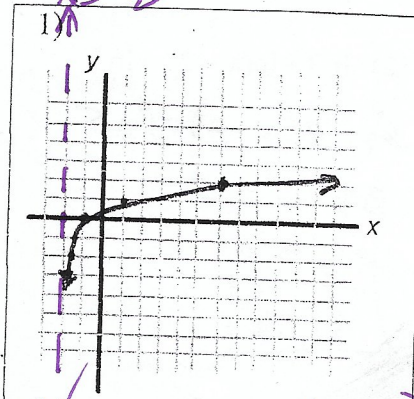
$2x \log 3 = x \log 4 - 3 \log 4$

$2x \log 3 - x \log 4 = -3 \log 4$

$x(2 \log 3 - \log 4) = -3 \log 4$

$x = \frac{-3 \log 4}{2 \log 3 - \log 4}$

$x \approx -5.1285$



- 1)  $x = -2$
- 2)  $x > -2$   $(-2, \infty)$
- 3)  $\mathbb{R}$   $(-\infty, \infty)$
- 4)  $\approx (0, 0.63)$
- 5)  $\text{as } x \rightarrow \infty, y \rightarrow \infty$   
 $\text{as } x \rightarrow -2, y \rightarrow -\infty$
- 6)  $x = 22$
- 7)  $x \approx 5.1972$
- 8)  $x = 8$
- 9)  $a = 3$
- 10)  $x = \frac{3}{2}$
- 11)  $x \approx -5.1285$
- 12)  $x = \frac{11}{3}$
- 13)  $x \approx 0.0069$
- 14)  $x > 7.1670$
- 15)  $x \approx -12.4565$
- 16)  $1.6992$
- 17)  $1.7859$
- 18)  $a^3 = 15$
- 19)  $36x^2 = \sqrt[3]{36x^2}$
- 20)  $\frac{\sqrt{3}}{6}$
- 21)  $8x^4 = 3$