Name: Key Date: 4/10/18 - 4/11/18

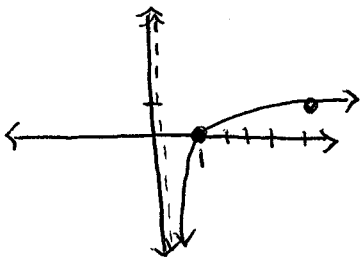
CC ALGEBRA 2 TROICI

UNIT 9 REVIEW- LOGS

$0 = \log_5 1$

TEST – THURSDAY 4/12/18!

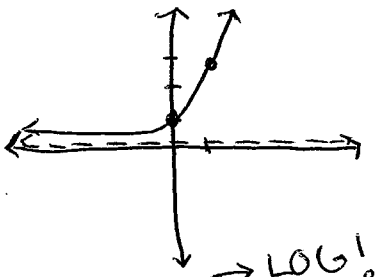
1. The graph of the function $y = \log_5 x$ appears in which quadrants? Sketch the graph, label the critical points, and write the equation of the asymptote.



(1,0) and (5,1) - critical points

Asymptote: $x = 0$

2. The graph of the function $y = 3^x$ appears in which quadrants? Sketch the graph, label the critical points, and write the equation of the asymptote.



(0,1) and (1,3) - critical points

Asymptote: $y = 0$

3. The point (1,0) is always present on which type of function? → LOG!
   1) $y = ax^2 + bx + c$ 3) $y = \log_b x$
   2) $f(x) = b^x$ 4) $f(x) = mx + b$

4. The point (0,1) is always present on which type of function? → EXPONENTIAL!
   1) $y = ax^2 + bx + c$ 3) $y = \log_b x$
   2) $f(x) = b^x$ 4) $f(x) = mx + b$

5. The inverse of $y = 10^x$ is obtained by reflecting the equation in the line:
   1) $y = x$ 3) $y = -x$
   2) $y = 0$ 4) $x = 0$

6. If $\log_b n = y$, then n equals $b^y = n$
   1) yb 3) y^b
   2) $\frac{y}{b}$ 4) b^y

7. If a point (a,b) lies on the graph $y = g(x)$, the graph of $y = g^{-1}(x)$ must contain point
   1) (b,a) 3) (a,0)
   2) (0,b) 4) (-a,-b)

g^{-1} → inverse → switch x & y

8. Solve for x: $\frac{1}{2} = \log_x 16$

$\left(x^{\frac{1}{2}}\right) = (16)^2$

$x =$

9. Solve for x to the nearest hundredth: $3^x = 24$

$\log_3 24 = x$

$x = 2.89$

10. Solve for x: $\log_x 27 = \frac{3}{2}$

$\left(x^{\frac{3}{2}}\right)^{\frac{2}{3}} = (27)^{\frac{2}{3}}$

$x = 9$

11. If $x = \frac{a\sqrt[3]{d}}{\sqrt{b}}$, then $\ln x$ is equal to:

a) $\ln a\sqrt[3]{d} - \frac{1}{2}\ln b$

b) $\ln a + 3\ln d - 2\ln b$

c) $\ln a + \frac{1}{3}\ln d + \frac{1}{2}\ln b$

d) $\ln a + \frac{1}{3}\ln d - \frac{1}{2}\ln b$

12. Solve for *x*: $2\log_5 x = \log_5 2x$

$\log_5 x^2 = \log_5 2x$

$x^2 = 2x$

$-2x \quad -2x$

reject! $x^2 - 2x = 0$

$x(x-2) = 0$

0 | 2

$\{2\}$

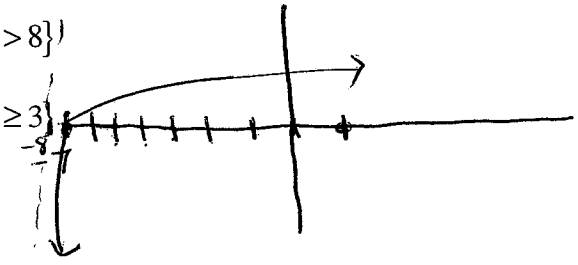
13. The domain of $y = \log_2(x+8)$ in the real numbers is

(1) $\{x \mid x > 0\}$

(2) $\{x \mid x > -8\}$

(3) $\{x \mid x > 8\}$

(4) $\{x \mid x \geq 3\}$



14. Express the following as a single log: $\log_b p + \log_b t - \frac{1}{2}\log_b q$

a) $\log_b \frac{pt}{\sqrt{q}}$

b) $\log_b pt\sqrt{q}$

c) $\log_b \frac{pt}{q^2}$

d) $\log_b p \log_b t \log_b \sqrt{q}$

15. If $f(x)=\log_3 x$, which of the following could be a value of x, where $f(x)=\log_3 x$ is NOT defined. There is more than one answer.

a) 3 b) .8 c) -4 d) 0

$y=\log x$ domain: $x>0$ or $(0,\infty)$

16. What is the inverse of $(-4,3)$?

$(3,-4)$

17. What is the inverse of the function $2x+3y=6$?

$2y+3x=6$

$-3x \quad -3x$

$\frac{2y}{2}=\frac{-3x}{2}+\frac{6}{2}$

$y=-\frac{3}{2}x+3$

18. What is the inverse of the function $y=\log_3 x$?

a) $y=x^3$ b) $y=3^x$

c) $y=\log_x 3$ d) $x=3^y$

$x=\log_3 y$

$y=3^x$

19. What is the inverse of the function $f(x)=\frac{3+4x}{x-2}$? (Show work algebraically!)

a) $f^{-1}(x)=\frac{2x+3}{x-4}$ b) $f^{-1}(x)=\frac{2x-3}{x+4}$

c) $f^{-1}(x)=\frac{3+4x}{x-2}$ d) $f^{-1}(x)=\frac{4x-2}{3-4x}$

$\frac{x}{1}=\frac{3+4y}{y-2}$

$3+4y=xy-2x$

$-3 \quad -xy \quad -xy \quad -3$

$4y-xy=-2x-3$

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

$y=\left(\frac{-2x-3}{4-x}\right)^{-1}$

$y=\frac{2x+3}{x-4}$

20. Which of the following is the inverse of $y=4^x$?

a) $y=\log_x 4$ b) $y=\log_4 x$

c) $y=4^x$ d) $x=\log_4 y$

$x=4^y$

$\log_4 x=y$

21. Solve for x: $\log_4(12x) - \log_4(3) = \log_4(56)$

$\log_4 \frac{12x}{3} = \log_4 56$

$4x = 56$

$\boxed{x = 14}$

22. Solve for x: $\log_2 2x + \log_2(x-4) = 6$

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

$2^6 = 2x^2 - 8x$

$-2^6 \qquad -2^6$

$2x^2 - 8x - 64 = 0$

$x^2 - 4x - 32 = 0$

$(x-8)(x+4) = 0$

$8 \qquad -4 \rightarrow$ reject

{8}

23. If $f(x) = \log x$, find $f(10{,}000)$

$f(10{,}000) = \log(10{,}000)$

$\boxed{4}$

24. Find the value of x to the nearest ten thousandth:

a. $\log x = 4.8200$

$10^{4.82} = x$

$\boxed{x = 66069.3448}$

b. $\ln x = 4.8200$

$e^{4.82} = x$

$\boxed{x = 123.9651}$

c. $e^x = 2$

$\log_e 2 = x$

$\ln 2 = x$

$\boxed{x = .6931}$

25. Given $g(x) = 5 + 4\log(x+3)$, describe the graph of *g* as a transformation of the common logarithm function.

$g(x) = 4\log(x+3) + 5$

dilation of 4 (compressed horizontally)

left 3

up 5

26. For the equation below: a. Identify the domain and range. b. State the transformations. c. Graph the function. d. Write the equation of the asymptote

$y = \log_6(x-1)-5$

Right 1, Down 5

Domain:

$(1, \infty)$

Range:

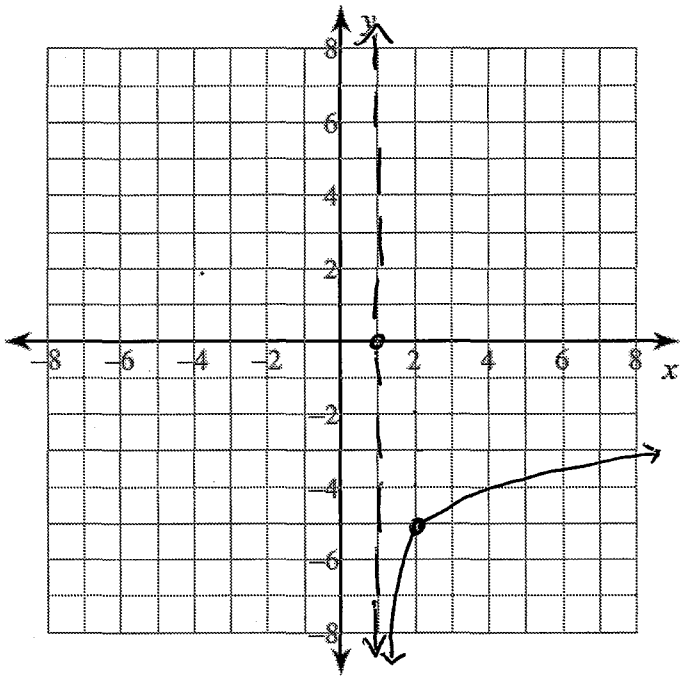
$(-\infty, \infty)$

Transformations:

Right 1, down 5

Equation of Asymptote:

$x = 1$



27. Which of the following is equivalent to $\log\frac{x^4}{1,000}$?

1) $4\log x - 3$

2) $\log\sqrt[4]{x} - 3$

3) $\frac{4\log x}{3}$

4) $\log\frac{4x}{3}$

$4\log x - \log 1000$

$4\log x - 3$

28. Describe the nature of the roots of the following equation: $2x^2 + 7x - 10 = 0$.

a) Real, rational, unequal

b) Real, irrational, unequal

c) Real, rational, equal

d) Imaginary

$b^2 - 4ac$

$7^2 - 4(2)(-10)$

$49 + 80 = 129$

29. The graph of a polynomial function f(x) is illustrated to the right. What is the remainder when f(x) is divided by (x + 2)?

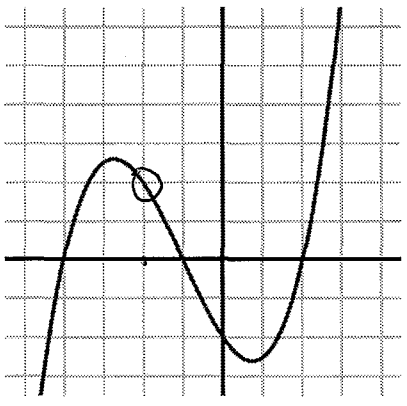
root = -2

(1) 0

(2) 2

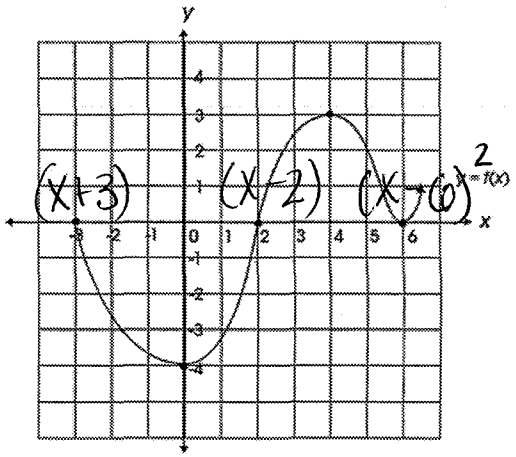
(3) -1

(4) -2



30. The graph of f(x) is shown to the right.

Which of the following is the factored form of the equation?



(1) $f(x) = (x - 3)(x + 2)(x + 6)$

(2) $f(x) = x(x + 3)(x - 2)^2(x - 6)$

(3) $f(x) = (x + 3)(x - 2)(x - 6)$

(4) $f(x) = (x + 3)(x - 2)(x - 6)^2$

31. What is the remainder when $x^3 - 8x^2 + 21x - 11$ is divided by $x - 3$? Use the remainder theorem, do not do long division.

root = 3

$(3)^3 - 8(3)^2 + 21(3) - 11$

$27 - 72 + 63 - 11$

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