Algebra 2 Name Key ID: 1

Assignment Date Period

Evaluate each expression.

1) $\log_4 16$

2) $\log_9 3$

3) $\log_{64} 4$

4) $\log_5 25$

Type in Calculator! Math, log base

Rewrite each equation in exponential form.

5) $\log_6 216 = 3$ $6^3 = 216$

6) $\log_5 y = x$ $5^x = y$

7) $\log_7 343 = 3$ $7^3 = 343$

8) $\log y = x$ $10^x = y$

Rewrite each equation in logarithmic form.

9) $x^y = 92$ $\log_x 92 = y$

10) $x^{-17} = y$ $\log_x y = -17$

11) $5^2 = 25$ $\log_5 25 = 2$

12) $p^{15} = 118$ $\log_p 118 = 15$

Solve each equation.

13) $\log(1-3n) = \log(-2n+4)$

$1-3n = -2n+4$
$+2n \quad +2n$
$1-n = 4$
$-1 \quad -1$
$-n = 3$
$\frac{-n}{-1} = \frac{3}{-1}$
$n = -3$

14) $\log(9-2p) = \log(-3p+8)$

$9-2p = -3p+8$
$+3p \quad +3p$
$9+p = 8$
$-9 \quad -9$
$p = -1$

* 15) $\log_{16}(2n+9) = \log_{16}(-n+3)$

$2n+9 = -n+3$
$-2n \quad -2n$
$9 = -3n+3$
$-3 \quad -3$
$\frac{6}{-3} = \frac{-3n}{-3}$
$-2 = n$

16) $\log_2(x-2) = \log_2(2x-9)$

$x-2 = 2x-9$
$-x \quad -x$
$-2 = x-9$
$+9 \quad +9$
$7 = x$

17) $\log_{12}(x^2-6)=\log_{12}3$

$x^2-6=3$
$+6 \quad +6$
$x^2=9$
$\sqrt{x^2} \quad \sqrt{9}$
$x=3$ or -3

$x=-3$
$x=3$

$x^2-6=3$
$-3 \quad -3$
$x^2-9=0$

$a=1$
$b=0$
$c=-9$

18) $\log_3(3a^2+9a)=\log_3(-20+2a^2)$

$a=-4$
$a=-5$

$3a^2+9a=-20+2a^2$
$+20 \quad +20$
$3a^2+9a+20=2a^2$
$-2a^2 \quad -2a^2$
$a^2+9a+20=0$
$a \quad b \quad c$

$a=1$
$b=9$
$c=20$

$\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

19) $\log_4(-7n-2)=\log_4(n^2+8)$

$-7n-2=n^2+8$
$+7n \quad +7n$
$-2=n^2+7n+8$
$+2 \quad +2$
$0=n^2+7n+10$

quadratic formula
$a=1 \quad b=7 \quad c=10$

$n=-2 \quad n=-5$

20) $\log_{17}(63-n)=\log_{17}(n^2-3n)$

$63-n=n^2-3n$
$+n \quad +n$
$63=n^2-2n$
$-63 \quad -63$
$0=n^2-2n-63$

$a=1 \quad b=-2 \quad c=63$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$\frac{2\pm\sqrt{(-2)^2-4(1)(63)}}{2(1)}$

$x=9 \quad x=-7$

21) $-6\log_2(x-5)=-24$

$-6 \quad -6$
$\log_2(x-5)=4$

$2^4=x-5$
$16=x-5$
$+5 \quad +5$
$21=x$

22) $5\log_3(n-6)=0$

$5 \quad 5$
$\log_3(n-6)=0$

$3^0=n-6$
$1=n-6$
$+6 \quad +6$
$7=n$

Condense each expression to a single logarithm.

23) $5\log_6 x-4\log_6 y$ (division)

$\log_6\left(\frac{x^5}{y^4}\right)$

24) $5\log_2 a+3\log_2 b$ (multiply)

$\log_2(a^5\cdot b^3)$

25) $24\log_9 u+4\log_9 v$ (mult.)

$\log_9(u^{24}\cdot v^4)$

26) $4\log_6 x-5\log_6 y$ (divide)

$\log_6\left(\frac{x^4}{y^5}\right)$

27) $6\log_5 x+12\log_5 y+6\log_5 z$

$\log_5(x^6y^{12}z^6)$

28) $9\log_7 z+9\log_7 x-3\log_7 y$

$\log_7\left(\frac{z^9x^9}{y^3}\right)$

29) $4\log_5 u + 4\log_5 w - 8\log_5 v$

$\log_5\left(\frac{u^4 w^4}{v^8}\right)$

30) $6\log_5 x + 6\log_5 z - 18\log_5 y$

$\log_5\left(\frac{x^6 z^6}{y^{18}}\right)$

Expand each logarithm.

31) $\log_3 (x^6 y^4)$ addition

$6\log_3 x + 4\log_3 y$

32) $\log_3 (a^5 b^2)$

$5\log_3 a + 2\log_3 b$

33) $\log_3 \frac{x^3}{y^2}$ ← subtraction

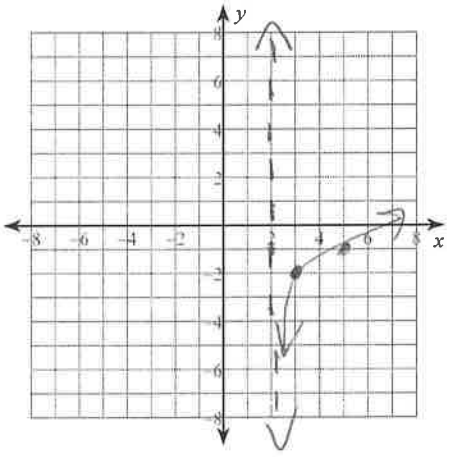
$3\log_3 x - 2\log_3 y$

34) $\log_7 \frac{a^3}{b^3}$

$3\log_7 a - 3\log_7 b$

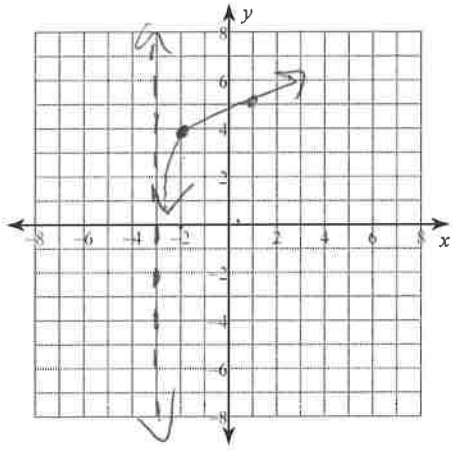
Sketch the graph of each function. Choose at least 2 points

35) $y = \log_3 (x-2) - 2$ Type in y= on calc



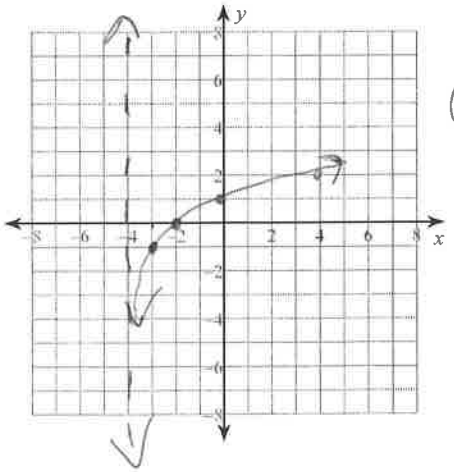
(3, -2)
(5, -1)

36) $y = \log_4 (x+3) + 4$



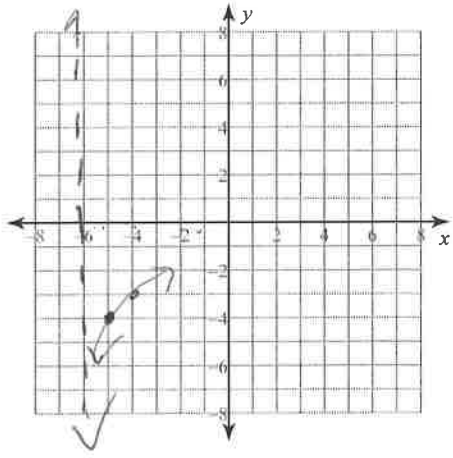
(-2, 4)
(1, 5)

37) $y = \log_2 (x+4) - 1$



(-3, -1)
(-2, 0)
(0, 1)
(4, 2)

38) $y = \log_2 (x+6) - 4$



(-5, -4)
(-4, -3)