

1. a) $\log_3(x+1) = y$ b) $b^{2x} = 5$

$$\boxed{3^y = x+1} \quad \checkmark$$

$$\boxed{\log_b 5 = 2x} \quad \checkmark \quad 2$$

2. a) $\log_b \left(\frac{xz}{y} \right)$

$$= \log_b(xz) - \log_b(y)$$

$$= \boxed{\log_b x + \log_b z - \log_b y} \quad \checkmark$$

b) $\log_b(x^2 z^7)$

$$= \log_b x^2 + \log_b z^7$$

$$= \boxed{2 \log_b x + 7 \log_b z} \quad \checkmark$$

c) $\log_b (\sqrt[5]{y^3 z})$

$$= \log_b (y^3 z)^{1/5}$$

$$= \frac{1}{5} \log_b (y^3 z)$$

$$= \frac{1}{5} \left[\underbrace{\log_b y^3}_{3 \log_b y} + \log_b z \right]$$

$$= \boxed{\frac{3}{5} \log_b y + \frac{1}{5} \log_b z} \quad \checkmark$$

restr?

4/5

3. $\frac{1}{2} \log_b x - \log_b w - \frac{3}{4} \log_b v$

$$= \log_b x^{1/2} - \log_b w - \log_b v^{3/4}$$

$$= \boxed{\log_b \left(\frac{x^{1/2}}{w v^{3/4}} \right)} \quad \checkmark$$

3

4. a) $\log_4 63 = \textcircled{3}$
 $4^3 = 64$

b) $\log 0.00001 = \textcircled{-5}$
 $10^{-5} = 0.00001$

c) $\log_b 1 = 0$

$x = \log_b 1$

$b^x = 1$

$x = 0$

d) $\log_3 \left(\frac{1}{9}\right) = x = -2$

$3^x = \frac{1}{9}$

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

e) $2^{\log_2 529} = 529$
 just

f) $\log_5 \sqrt[3]{125} = x = \textcircled{1}$

$5^x = \sqrt[3]{125}$

$5^x = 5^1$

$x = 1$

g) $\log_3 54 + \log_3 \left(\frac{3}{2}\right) = \textcircled{4}$

$= \log_3 (54) \left(\frac{3}{2}\right)$

$= \log_3 81$

$= \log_3 3^4$

$= 4 \log_3 3 = 4(1) = 4$

h) $\log_5 0 = x = \text{no solution}$

$5^x = 0$

No solution.

i) $\log_6 40 - \log_6 10 + \log_6 9 = \textcircled{2}$

$= \log_6 \frac{(40)(9)}{10}$

$= \log_6 36 = 2$

$= 6^2 = 36$

5. $f(x) = 2\log_2(x-1) - 3$

$a = 2$
 $b = 2$
 $k = 1$
 $d = 1$
 $c = -3$

x	y
$1/2$	-1
1	0
2	1
4	2
8	3

$y = \log_2 x ; 2^y = x$

mapping
rule:

$y_n = 2y_0 - 3$

$x_n = x_0 + 1$

transformed
table:

$x+1$	$2y-3$
$3/2$	-5
2	-3
3	-1
5	1
9	3

$f(x) = 2\log_2(x-1) - 3$

x -intercept:

$2\log_2(x-1) - 3 = 0$

$\frac{2\log_2(x-1)}{2} = \frac{3}{2}$

$\log_2(x-1) = \frac{3}{2}$

$x-1 = 2^{3/2}$

$x = 2^{3/2} + 1$

$x \approx 3.83$ (x -int.)

y -intercept:

$2\log_2(0-1) - 3$

No y -int.

