5.2 Pt. 2 Graphing Logarithmic Functions

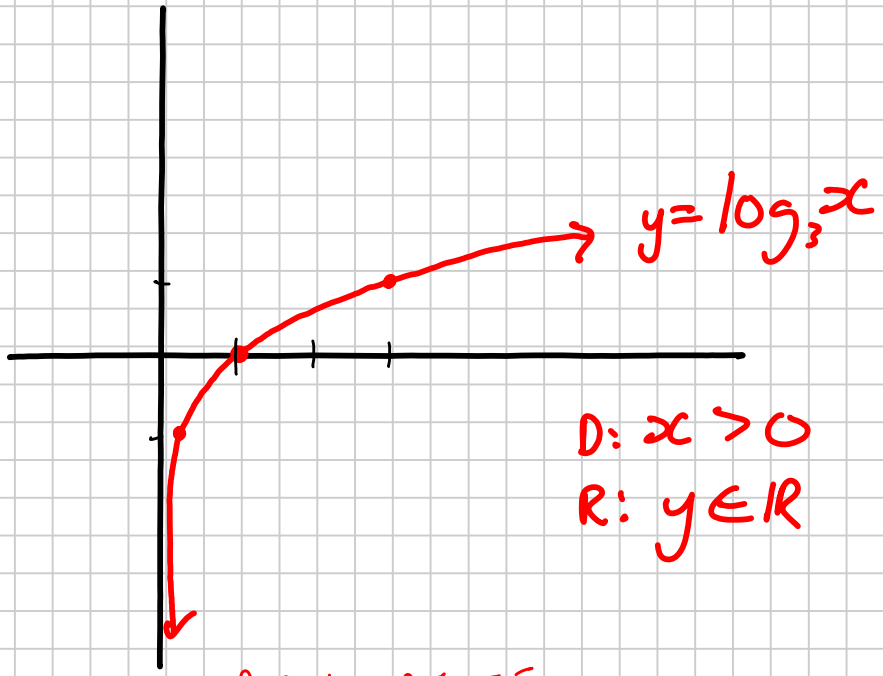
Note Title 2008-02-27

① Graph $y = \log_3 x$ using a table of values.

$3^y = x$

x	y
$\frac{1}{3}$	-1
1	0
3	1

Pick these y-values + solve for x



(2) Graph $y = \log_6 x$ and $y = \log_2 x$ using a table of values

$y = \log_6 x$

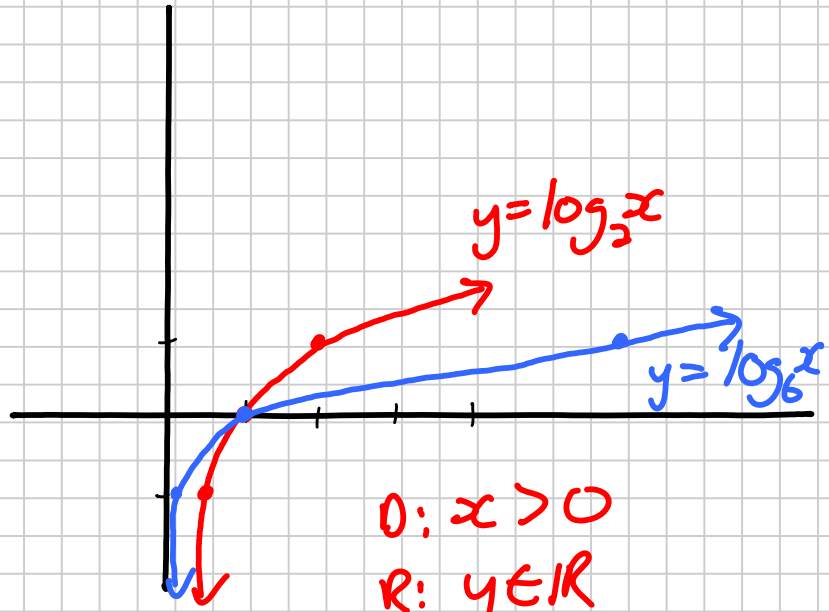
$6^y = x$

x	y
$\frac{1}{6}$	-1
1	0
6	1

$y = \log_2 x$

$2^y = x$

x	y
$\frac{1}{2}$	-1
1	0
2	1



D: $x > 0$

R: $y \in \mathbb{R}$

$x = 0$ ASYMPTOTE

(3) State the domain of the following:

Recall: Given $y = \log_b x$

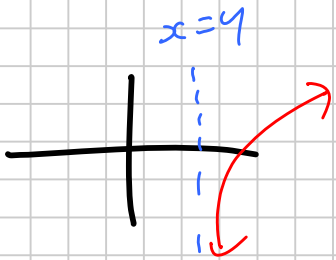
$x > 0$

$b > 0, b \neq 1$

a) $y = \log(x-4)$

$x - 4 > 0$

D: $x > 4$



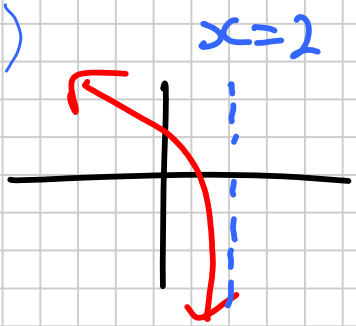
b) $y = \log(2-x)$

$y = \log(-(x-2))$

$2 - x > 0$

$-x > -2$

D: $x < 2$



c) $y = \log_{2+x}(x-3)$

$x - 3 > 0$

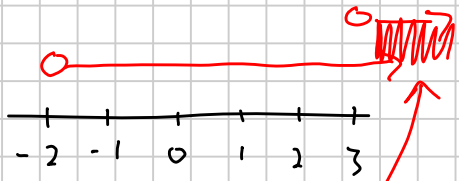
$x > 3$

AND

$2 + x > 0$

$x > -2$

$\therefore$ $D: x > 3$



d) $y = \log_{x-4}(x+5)$

$x + 5 > 0$

$x > -5$

$x - 4 > 0$

$x > 4$

$x - 4 \neq 1$

$x \neq 5$

$D: x > 4, x \neq 5$

(4) Determine the inverse

a) $y = 2^{x-1} + 3$

$x = 2^{y-1} + 3$ → Switch x and y, solve for y.

$x - 3 = 2^{y-1}$ → Change from exponential → logarithmic

$y - 1 = \log_2(x-3)$

$$\boxed{y = \log_2(x-3) + 1}$$

b) $y = 4^{x+2} - 5$

$x = 4^{y+2} - 5$

$x + 5 = 4^{y+2}$

$y + 2 = \log_4(x+5)$

$$\boxed{y = \log_4(x+5) - 2}$$

c) $y = \log_5(x+1) - 3$

$x = \log_5(y+1) - 3$

$x + 3 = \log_5(y+1)$

$5^{x+3} = y + 1$

$$\boxed{y = 5^{x+3} - 1}$$

Pg 211

3, 4 (b, d, f, h, j)

5 – 9

13