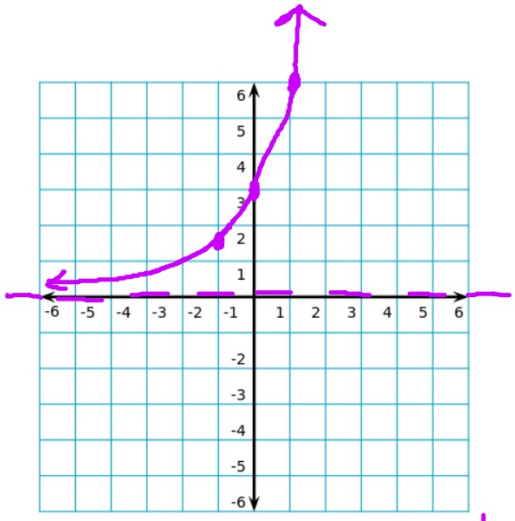
1.) $y = 3 \cdot 2^x$

x	y
-1	$3 \cdot 2^{-1} = 3/2$
0	$3 \cdot 2^0 = 3$
1	$3 \cdot 2^1 = 6$

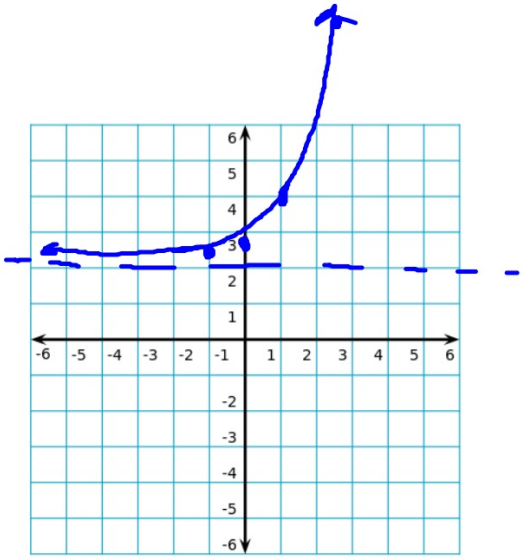


D: $\{x \mid x \in \mathbb{R}\}$

R: $\{y \mid y > 0\}$

4.) $y = \frac{1}{4} \cdot 8^x + 2$

x	y
-1	$\frac{1}{4} \cdot \frac{1}{8} + 2 = 2\frac{1}{32}$
0	$\frac{1}{4} \cdot 1 + 2 = 2\frac{1}{4}$
1	$\frac{1}{4} \cdot 8^1 + 2 = 4$
2	$\frac{1}{4} \cdot \underset{16}{8^2} + 2 = 18$

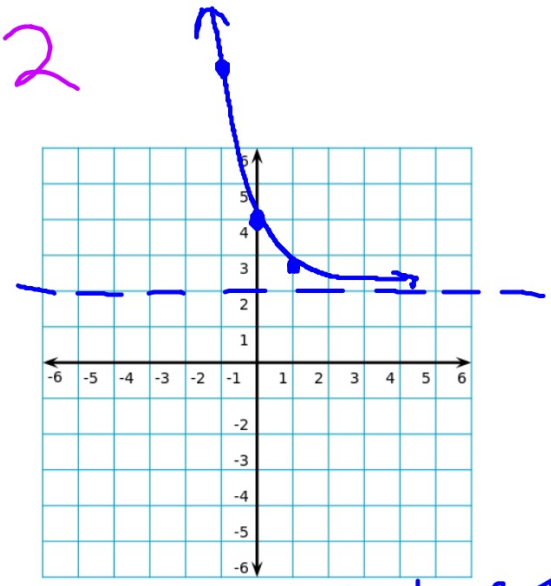


6.) $y = -3\left(\frac{1}{2}\right)^{x+2}$

x	y
-3	$-3\left(\frac{1}{2}\right)^{-1} = -6$
-2	
-1	

5.) $y = 2 \cdot \left(\frac{1}{3}\right)^x + 2$

x	y
-1	$2\left(\frac{1}{3}\right)^{-1} + 2 = 8$
0	$2\left(\frac{1}{3}\right)^{0} + 2 = 4$
1	$2\left(\frac{1}{3}\right)^{1} + 2 = 2\frac{2}{3}$



D: $\{x \mid x \in R\}$

R: $\{y \mid y > 2\}$

Sketching log functions/solving exponential equations

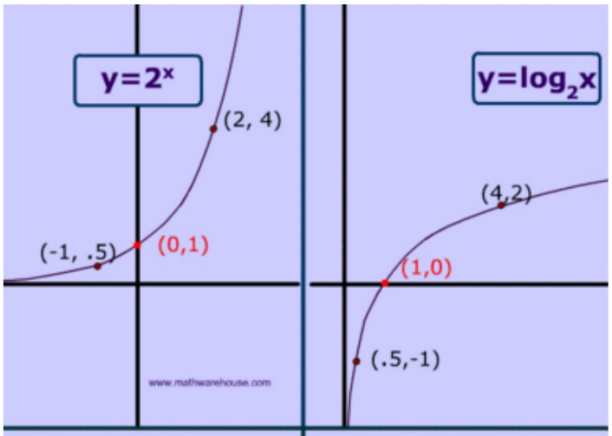
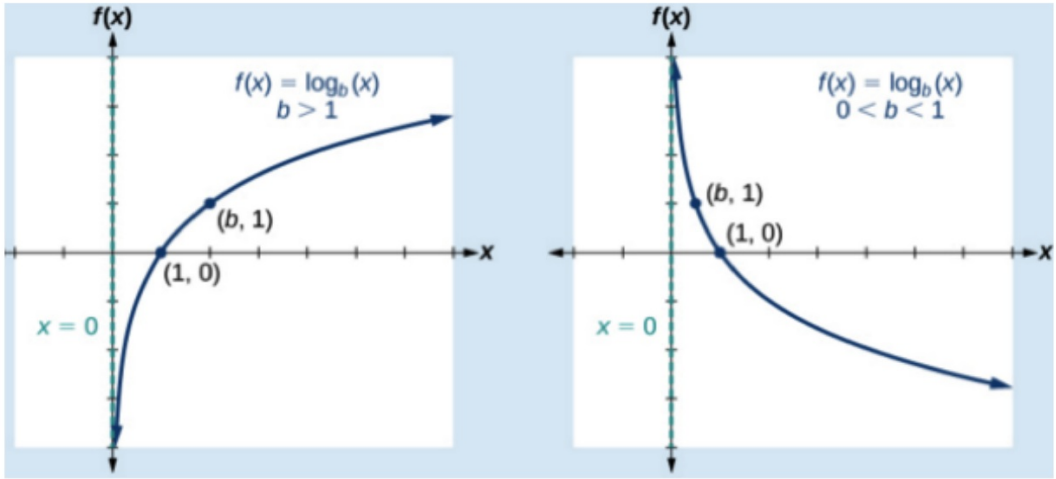


Table of values

x	y
(-2 , .25)	
(-1 , .5)	
(0 , 1)	
(1 , 2)	
(2 , 4)	
(3 , 8)	
(4, 16)	
(5, 32)	

Table of values

x	y
(.25, -2)	
(.5, -1)	
(1, 0)	
(2, 1)	
(4 , 2)	
(8 , 3)	
(16 , 4)	
(32 , 5)	


f(x)
f(x) = log_b(x)
b > 1
(b, 1)
(1, 0)
x = 0
x
f(x)
f(x) = log_b(x)
0 < b < 1
(b, 1)
(1, 0)
x = 0
x

Sketch. State the domain and range in interval notation.

a) $y = \log_2 x$

VA

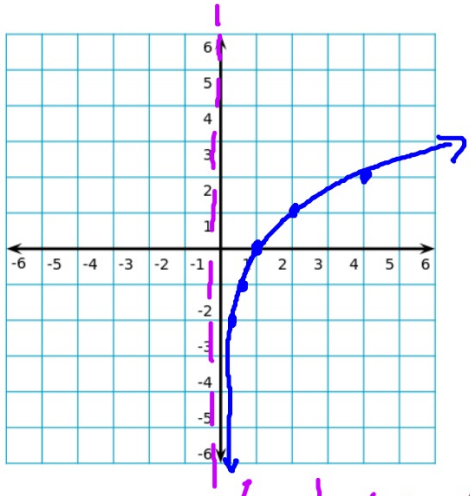
$2^y = 2^{\log_2 x}$

$\boxed{2^y = x}$

x	y
1/4	-2
1/2	-1
1	0
2	1
4	2

VA
$x = 0$

Put y-values on the chart and found x-values



D: $\{x \mid x > 0\}$
R: $\{y \mid y \in R\}$

Sketch. State the domain and range in interval notation.

b) $y = \log_3(x-2)$

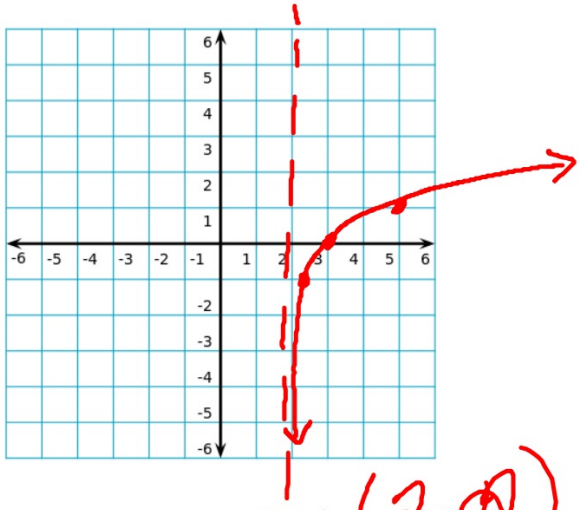
$3 \quad 3$

$3^y = x - 2$

$3^y + 2 = x$

VA: $x = 2$

x	y
$2\frac{1}{3}$	-1
3	0
5	1



D: $(2, \infty)$

R: $(-\infty, \infty)$

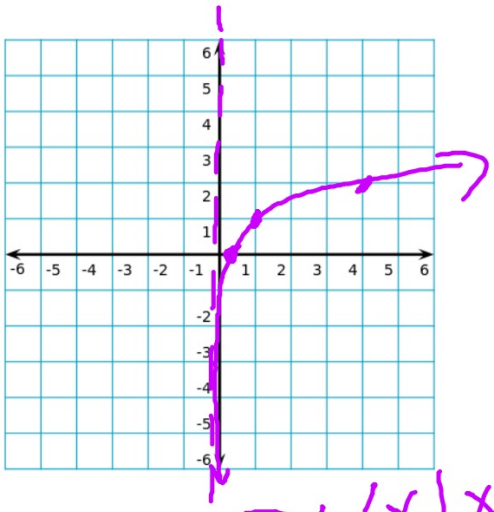
Sketch. State the domain and range in ~~interval~~ set notation.

c) $y = 1 + \log_4 x$

$y - 1 = \log_4 x$

$4^{y-1} = x$

x	y
$1/4$	0
1	1
4	2



D: $\{x \mid x > 0\}$

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

Sketch. State the domain and range in interval notation.

D: $(-3, \infty)$

R: $(-\infty, \infty)$

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

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

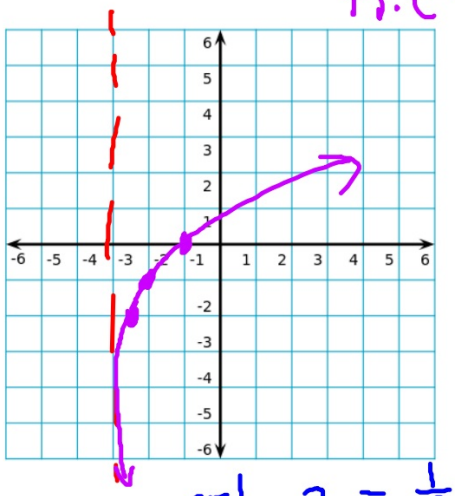
$2 \qquad 2$

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

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

VA

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



$2^{-1} - 3 = \frac{1}{2} - 3$

$= -2\frac{1}{2}$

$$\frac{1}{2} - 7$$

$$-6\frac{1}{2}$$

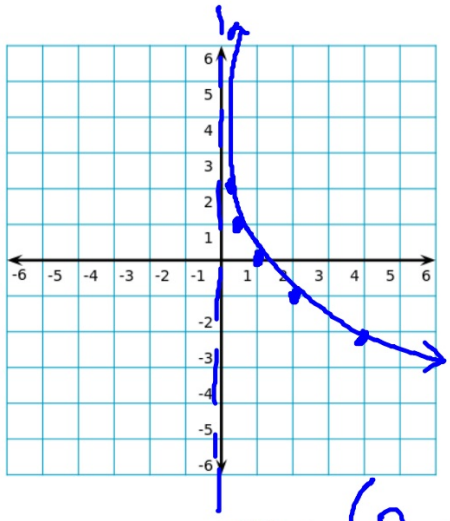
Sketch. State the domain and range in interval notation.

e) $y = -\log_2 x$

$-y = \log_2 x$

$2^{-y} = x$

x	y
2	−1
1	0
1/2	1
1/4	2
4	−2

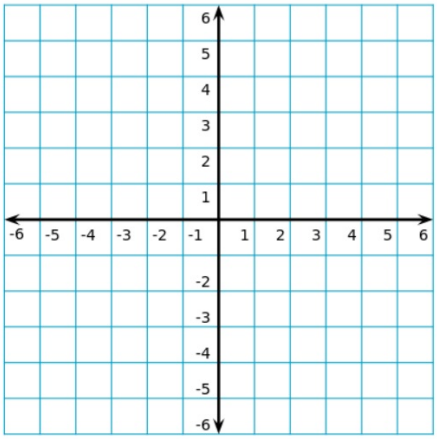


D: $(0, \infty)$

R: $(-\infty, \infty)$

Sketch. State the domain and range in interval notation.

f) $y = \log_{1/2}(x+3)$



Solving Exponential Equations (Type 1) - to solve, use the property of equality to make the bases equal. (We will learn type 2 tomorrow)

Property of Equality for Exponential Equations

If $a^x = a^y$ *then* $x = y$

$$\cancel{\log_2} 2^x = \cancel{\log_2} 2^{3x+5}$$

$$x = 3x+5$$

Solve.

a) $3^x = 9^{x+2}$

$3^x = 3^{2(x+2)}$

$x = 2(x+2)$

$x = 2x + 4$

$-x = 4$

$x = -4$

b) $27^x = 81^{x-2}$

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

$3x = 4x - 8$

$-4x \quad -4x$

$-x = -8$

$x = 8$

Solve.

c) $7^{5-x} = \left(\frac{1}{7}\right)^{5x+3}$

$7^{5-x} = 7^{-1(5x+3)}$

$5 - \cancel{x} = -\cancel{5x} - 3$

$-\cancel{5} + \cancel{5x} \qquad +\cancel{5x} - \cancel{5}$

$4x = -8$

$x = -2$

d) $125^{x} = \left(\frac{1}{25}\right)^{x-1}$

$5^{3x} = 5^{-2(x-1)}$

$3x = -2x + 2$

$5x = 2$

$x = 2/5$

Solve.

e) $4^{3x-1} = 2^{3x-7}$

$2^{2(3x-1)} = 2^{3x-7}$

$2(3x-1) = 3x-7$

$6x-2 = 3x-7$

$3x = -5$

$x = -5/3$

f) $32^{-x-4} = 16^{x-2}$

$2^{5(-x-4)} = 2^{4(x-2)}$

$-5x-20 = 4x-8$

$-9x = 12$

$x = \frac{-12}{9} = \frac{-4}{3}$

Solve.

g) $3^x \cdot 9^{x+1} = 3^{x-1}$

$$3^x \cdot 3^{2(x+1)} = 3^{x-1}$$

$$x + 2(x+1) = x - 1$$

$$x + 2x + 2 = x - 1$$

$$3x + 2 = x - 1$$

$$2x = -3$$

$$x = -3/2$$

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

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

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

$$x^2 + x - 6 = 0$$

$$(x+3)(x-2) = 0$$

$$x = -3, 2$$