

$\log_a x = y$   
 $a^y = x$

Unit 2

Exponents and Logarithms

**Exponential**

 $y=2^x$   
 $y=3^x$   
 $y=4^x$   
**Asymptote**

2.5 Graphing Logarithmic Equations

Graph  $y = 10^x$  and it's inverse:

~~$x = 10^y$~~

$\log_{10} x = y$

	$y = 10^x$	$y = \log x$
Domain:	$x \in \mathbb{R}$	$x > 0$
Range:	$y > 0$	$y \in \mathbb{R}$
X-int:	none	$(1, 0)$
Y-int:	$(0, 1)$	none
Asymptotes:	<u><math>y = 0</math></u>	<u><math>x = 0</math></u>

$\log_a x = y$   
 $a^y = x$

Unit 2

Exponents and Logarithms

**Exponential**

 $y=2^x$   
 $y=3^x$   
 $y=4^x$   
**Asymptote**

Ex.) Graph  $y = \log_2 x$  and determine its characteristics (domain, range, x-int, y-int, and asymptotes). Find intercepts algebraically:

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

Domain:  $x > 0$

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

X-int:  $(1, 0)$

Y-int: none.

Asymptote:  $x = 0$

X-int

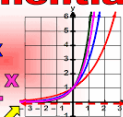
 ~~$0 = \log_2 x$~~   
 $x = 2^0$   
 $x = 1$

Y-int

 $y = \log_2 0$   
 "error"  
 $2^y = 0$   
 undefined.

$\log_a x = y$   
 $a^y = x$

Exponential

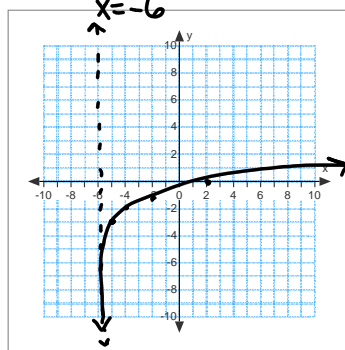
 $y = 2^x$   
 $y = 3^x$   
 $y = 4^x$ 


Asymptote

Ex.) Graph  $y = \log_2(x+6) - 3$  and determine its characteristics (domain, range, x-int, y-int, and asymptotes). Find intercepts algebraically:  
 HT 6 left, VT 3 down

Domain:  $x > -6$   
 Range:  $y \in \mathbb{R}$   
 X-int:  $(2, 0)$   
 Y-int:  $(0, -0.4)$   
 Asymptote:  $x = -6$


$x+6 > 0$   
 $x > -6$



X-int	Y-int
$0 = \log_2(x+6) - 3$	$y = \log_2(0+6) - 3$
$3 = \log_2(x+6)$	$y = \log_2 6 - 3$
$2^3 = x+6$	$y = \frac{\log 6}{\log 2} - 3$
$x = 2$	

$\log_a x = y$   
 $a^y = x$

Exponential

 $y = 2^x$   
 $y = 3^x$   
 $y = 4^x$ 


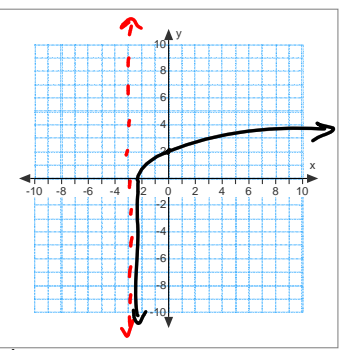
Asymptote

Ex.) Graph  $y = \log_2(2x+6)$  and determine its characteristics (domain, range, x-int, y-int, and asymptotes). Find intercepts algebraically:

$y = \log(2x+6) / \log(2)$

Domain:  $x > -3$   
 Range:  $y \in \mathbb{R}$   
 X-int:  $(-5/2, 0)$   
 Y-int:  $(0, 2.6)$   
 Asymptote:  $x = -3$

$2x+6 > 0$   
 $2x > -6$   
 $x > -3$



X-int	Y-int
$0 = \log_2(2x+6)$	$y = \log_2(2(0)+6)$
$2^0 = 2x+6$	$y = \log_2 6$
$1 = 2x+6$	$y \approx 2.6$
$-5 = 2x$	
$x = -5/2$	

$\log_a x = y$   
 $a^y = x$

**Exponential**

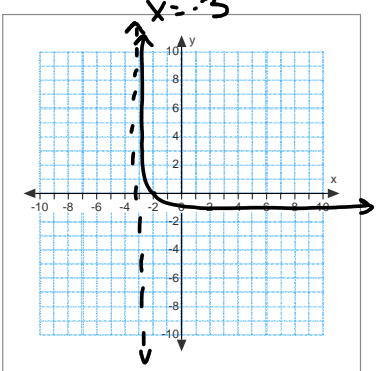
 $y = 2^x$   
 $y = 3^x$   
 $y = 4^x$   
**Asymptote**

Ex.) Graph  $y = -\log(x+3)$  and determine its characteristics (domain, range, x-int, y-int, and asymptotes). Find intercepts algebraically:

$$x+3 > 0$$

$$x > -3$$

Domain:  $x > -3$   
 Range:  $y \in \mathbb{R}$   
 X-int:  $(-2, 0)$   
 Y-int:  $(0, -0.48)$   
 Asymptote:  $x = -3$



X-int	Y-int
$0 = -\log_{10}(x+3)$	$y = -\log(0+3)$
$0 = \log_{10}(x+3)$	$y = -\log 3$
$10^0 = x+3$	$y \approx -0.48$
$x = 1-3 = -2$	

$\log_a x = y$   
 $a^y = x$

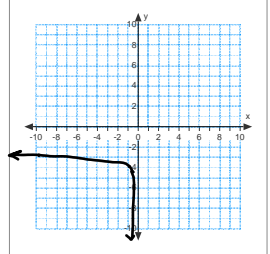
**Exponential**

 $y = 2^x$   
 $y = 3^x$   
 $y = 4^x$   
**Asymptote**

Ex.) Graph  $y = \log(-x) - 4$  and determine its characteristics (domain, range, x-int, y-int, and asymptotes). Find intercepts algebraically:

$$\frac{-1x}{-1} > \frac{0}{-1}$$

Domain:  $x < 0$   
 Range:  $y \in \mathbb{R}$   
 X-int:  $(-10000, 0)$   
 Y-int: none.  
 Asymptote:  $x = 0$



X-int	Y-int
$0 = \log(-x) - 4$	$y = \log(0) - 4$
$4 = \log_{10}(-x)$	undefined
$10^4 = -x$	
$x = -10000$	

Pg. 389 # 1, 5, 6, 8, 12, 13, 14.