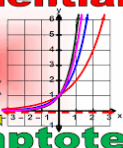


Unit 2

Exponents and Logarithms

Exponential

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



Asymptote

2.3 Solving Exponential Equations with Like Bases


In order to solve exponential equations with like bases, we need to be able to recognize some common exponents.

Ex.) Convert the following to a like base of '2'.

a) 4	b) 8	c) 16	d) 32	e) 1
2^2	2^3	2^4	2^5	2^0

Ex.) Convert the following to a like base of '5'.

a) 1	b) 25	c) 125	d) 1/5	e) 1/25
5^0	5^2	5^3	$\frac{1}{5}$ $= 5^{-1}$	5^{-2}

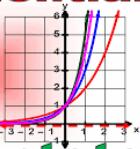


Unit 2

Exponents and Logarithms

Exponential

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



Asymptote

Steps for solving exponential equations:

** isolate.*

1. Look for like bases. If they are not immediate, see if you can create like bases.
2. Drop the bases and solve the exponents using algebra.

Ex.) Solve.

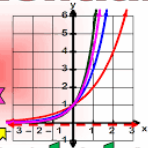
a) $3^x = 27$	b) $10^{2x} = 100$	c) $2^{x+1} = 8$	d) $4^{x-2} = 14$
$3^{\cancel{x}} = 3^3$	$10^{2x} = 10^2$	$2^{x+1} = 2^3$	$4^{x-2} = 14$
$3 = 3$	$2x = 2$	$x+1 = 3$	$4^x = 16$
$x = 3$	$x = 1$	$x = 2$	$4^x = 4^2$
			$x = 2$

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

Exponential

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

Asymptote



Ex.) Solve.

a) $4^{x+2} = 64^x$

$$4^{x+2} = 4^{3x}$$

$$x+2 = 3x$$

$$2 = 2x$$

$$x = 1$$

b) $4^{2x} = 8^{2x-3}$

brackets!

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

$$4x = 6x - 9$$

$$-6x - 6x$$

$$-2x = -9$$

$$x = 9/2$$

c) $3^{x+1} = 10$

$$3^x = 9$$

$$3^x = 3^2$$

$$x = 2$$

d) $4^{x-3} = 1024$

$$4^{x-3} = 4^5$$

$$x-3 = 5$$

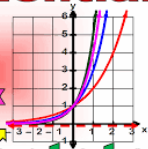
$$x = 8$$

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

Exponential

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

Asymptote



Ex.) Solve.

a) $8^{3x-2} = 16^{x+1}$

$$2^{3(3x-2)} = 2^{4(x+1)}$$

$$3(3x-2) = 4(x+1)$$

$$9x-6 = 4x+4$$

$$5x = 10$$

$$x = 2$$

b) $27^{x+3} = (1/9)^{2x-5}$

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

$$3x+9 = -4x+10$$

$$7x = 1$$

$$x = 1/7$$

$$\log_a x = y$$

$$a^y = x$$

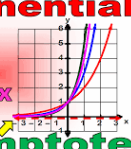
Exponential

$y=2^x$

$y=3^x$

$y=4^x$

Asymptote



c) $8^{x+6} = 32^{3x-4}$

$$\frac{2^{3(x+6)}}{2^{4(2x-1)}} = 2^{5(3x-4)}$$

$$(3x+18) + (-8x+4) = 15x-20$$

$$-5x+22 = 15x-20$$

$$42 = 20x$$

$$x = \frac{21}{10}$$

d) $(1/8)^{x-3} = 2(16)^{2x+1}$

$$2^{-3(x-3)} = 2^1 \cdot 2^{4(2x+1)}$$

$$-3(x-3) = 1+4(2x+1)$$

$$-3x+9 = 1+8x+4$$

$$-3x+9 = 8x+5$$

$$-11x = -4$$

$$x = 4/11$$

Verify using calc.

Worksheet