

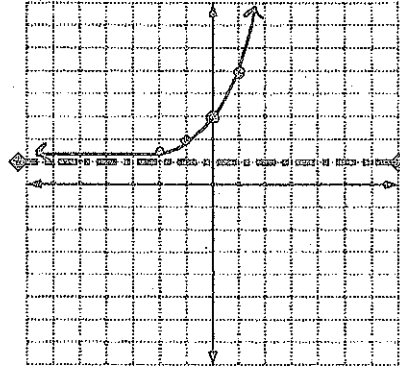
**Graphing Exponential Equations
and Their Inverse Functions - NOTES**

- What do we need to find to graph an exponential function?

- To graph:

- 1) Make a T-Chart centered where the exponent will = 0.
- 2) Find the y-intercept (will always have one)
- 3) Sketch the asymptote
- 4) Sketch the graph
- 5) Determine the domain, range and equation of the asymptote

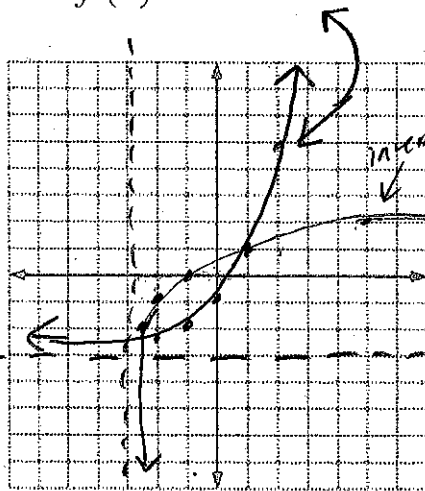
ALL EXPONENTIAL FUNCTIONS WILL HAVE AN ASYMPTOTE!



Example 1: Graph the following function and its inverse.

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

x	y
-2	-2.5
-1	-2
0	-1
1	1
2	5



	Function	Inverse
x-int:	$\approx (-1.63, 0)$	$(-1, 0)$
y-int:	$(0, -1)$	$(0, -1.63)$
Dom:	\mathbb{R}	$(-3, \infty)$
Range:	$(-3, \infty)$	\mathbb{R}
Asymp:	$y = -3$	$x = -3$

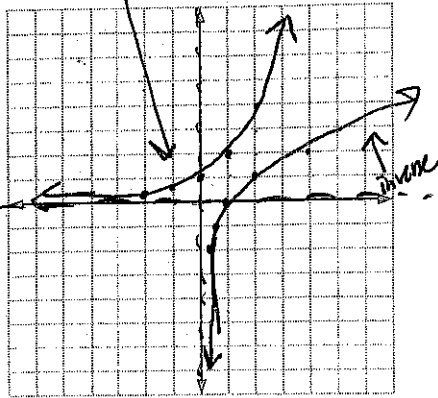
inverse

x	y
-2.5	-2
-2	-1
-1	0
1	1
5	2

1.

$f(x) = 2^x$

x	y
-2	.25
-1	.5
0	1
1	2
2	4



Domain
Range
Y intercept
X intercept
Asymptote

inverse

x	y
.25	-2
.5	-1
1	0
2	1
4	2

EXPONENTIAL FUNCTION

INVERSE FUNCTION

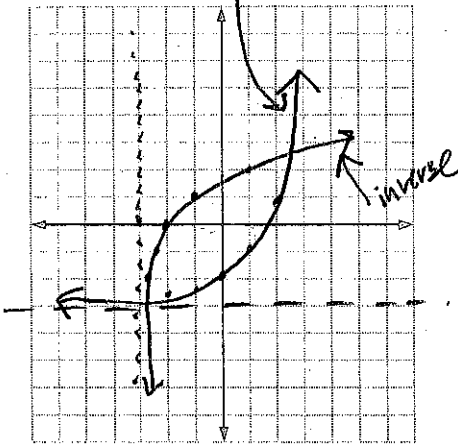
\mathbb{R}
 $(0, \infty)$
 $(0, 1)$
None
 $y = 0$

$(0, \infty)$
 \mathbb{R}
None
 $(1, 0)$
 $x = 0$

2.

$f(x) = 2^x - 3$

x	y
-2	-2.75
-1	-2.5
0	-2
1	-1
2	1



Domain
Range
Y intercept
X intercept
Asymptote

inverse

x	y
-2.75	-2
-2.5	-1
-2	0
-1	1
1	2

EXPONENTIAL FUNCTION

INVERSE FUNCTION

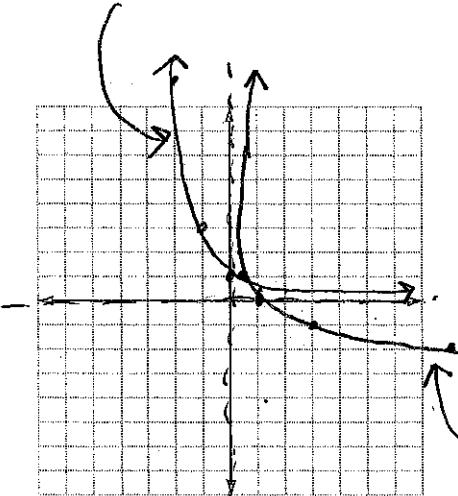
\mathbb{R}
 $(-3, \infty)$
 $(0, -2)$
 $(1.58, 0)$
 $y = -3$

$(-3, \infty)$
 \mathbb{R}
 $(0, 1.58)$
 $(-2, 0)$
 $x = -3$

3.

$f(x) = \frac{1}{3}^x$

x	y
-2	9
-1	3
0	1
1	.33
2	.11



Domain
Range
Y intercept
X intercept
Asymptote

inverse

x	y
9	-2
3	-1
1	0
.33	1
.11	2

EXPONENTIAL FUNCTION

INVERSE FUNCTION

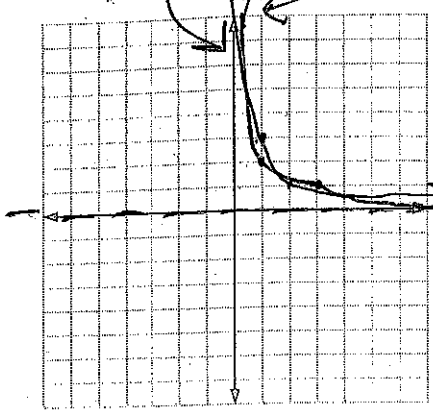
\mathbb{R}
 $(0, \infty)$
 $(0, 1)$
None
 $y = 0$

$(0, \infty)$
 \mathbb{R}
None
 $(1, 0)$
 ~~$x = 0$~~

X	Y
-2	81
-1	27
0	9
1	3
2	1

4.

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



Domain
Range
Y intercept
X intercept
Asymptote
Inverse

X	Y
81	-2
27	-1
9	0
3	1
1	2

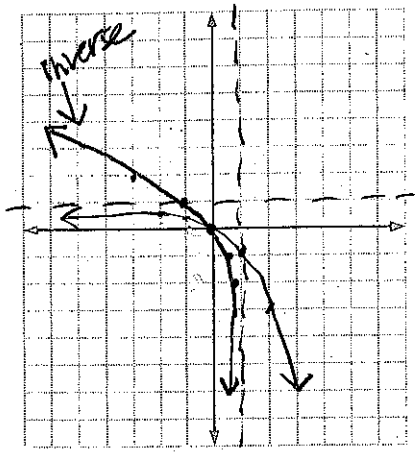
EXPONENTIAL
FUNCTION
 \mathbb{R}
 $(0, \infty)$
 $(0, 9)$
none
 $y=0$

INVERSE
FUNCTION
 $(0, \infty)$
 \mathbb{R}
none
 $(9, 0)$
 $x=0$

5.

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

X	Y
-2	.75
-1	.5
0	0
1	-1
2	-3



Domain
Range
Y intercept
X intercept
Asymptote
inverse

X	Y
.75	-2
.5	-1
0	0
1	1
2	2

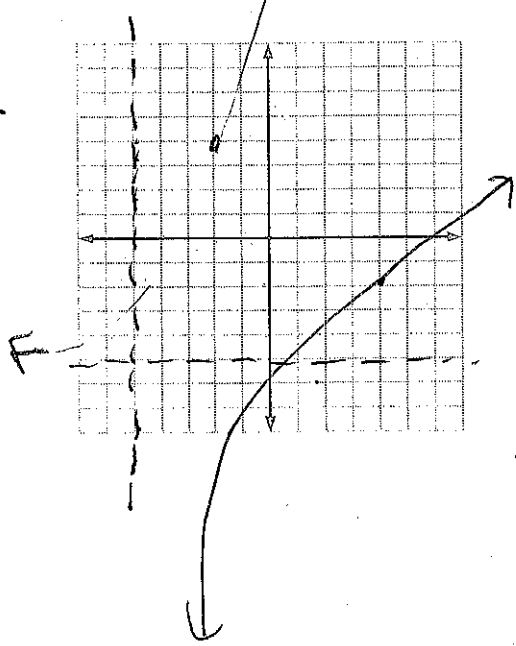
EXPONENTIAL
FUNCTION
 \mathbb{R}
 $(-\infty, 1)$
 $(0, 0)$
 $(0, 0)$
 $y=1$

INVERSE
FUNCTION
 $(-\infty, 1)$
 \mathbb{R}
 $(0, 0)$
 $(0, 0)$
 $x=1$

6.

$$f(x) = 3^{x+4} - 5$$

X	Y
-2	4
-1	22
0	76
1	238
2	



Domain
Range
Y intercept
X intercept
Asymptote
inverse

X	Y
4	-3
22	-1
76	0
238	1

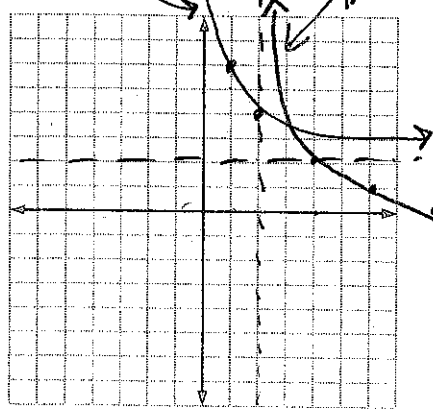
EXPONENTIAL
FUNCTION
 \mathbb{R}
 $(-5, \infty)$
 $(0, 76)$
 $(-2.53, 0)$
 $y=-5$

INVERSE
FUNCTION
 $(-5, \infty)$
 \mathbb{R}
 $(0, -2.53)$
 $(76, 0)$
 $x=-5$

7.

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

X	Y
-2	34
-1	18
0	10
1	6
2	4



Domain
Range
Y intercept
X intercept
Asymptote

inverse

X	Y
34	-2
18	-1
10	0
6	1
4	2

EXPONENTIAL
FUNCTION

\mathbb{R}
 $(2, \infty)$
 $(6, 10)$
none
 $y=2$

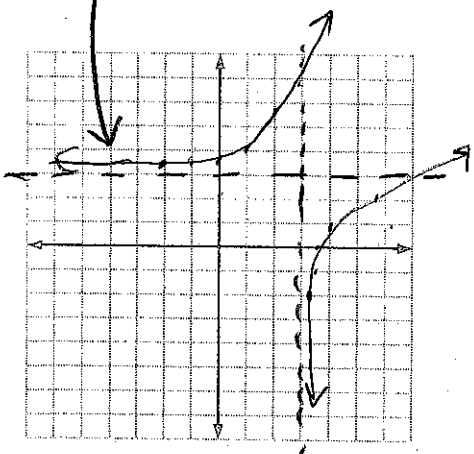
INVERSE
FUNCTION

$(2, \infty)$
 \mathbb{R}
none
 $(10, 0)$
 $x=2$

8.

$$f(x) = e^{x-1} + 3$$

X	Y
-2	3.05
-1	3.13
0	3.36
1	4
2	5.71



Domain
Range
Y intercept
X intercept
Asymptote

inverse

X	Y
3.05	-2
3.13	-1
3.36	0
4	1
5.71	2

EXPONENTIAL
FUNCTION

\mathbb{R}
 $(3, \infty)$
 $(0, 3.36)$
none
 $y=3$

INVERSE
FUNCTION

$(3, \infty)$
 \mathbb{R}
none
 $(3.36, 0)$
 $x=3$