

Name: 1st Hour

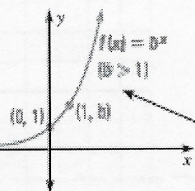
## Chapter 7 – Exponential and Logarithmic Functions Algebra II

### Sections 1 & 2 – Graph Exponential Growth and Decay Functions

#### Exponential Function

##### Exponential Growth

The  $x$ -axis is an asymptote of the graph. An asymptote is a line that a graph approaches more and more closely.

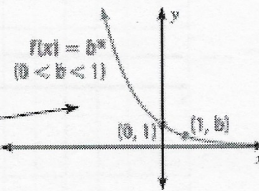


The graph rises from left to right, passing through the points  $(0, 1)$  and  $(1, b)$ .

The domain of  $f(x) = b^x$  is all real numbers. The range is  $y > 0$ .

##### Exponential Decay

The graph falls from left to right, passing through the points  $(0, 1)$  and  $(1, b)$ .



The  $x$ -axis is an asymptote of the graph.

The domain of  $f(x) = b^x$  is all real numbers. The range is  $y > 0$ .

#### Example 1

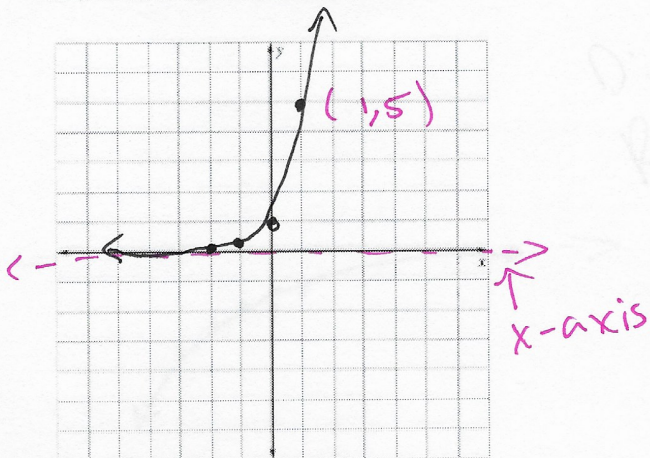
Graph the following exponential growth and decay functions. State the domain and range.

a.)  $y = 5^x$

$y = \frac{1}{5} \cdot 5^x$

x	y
-2	$\frac{1}{25} = .04$
-1	$.2 = \frac{1}{5}$
0	1
1	5
2	25

growth  
b/c  
 $b > 1$

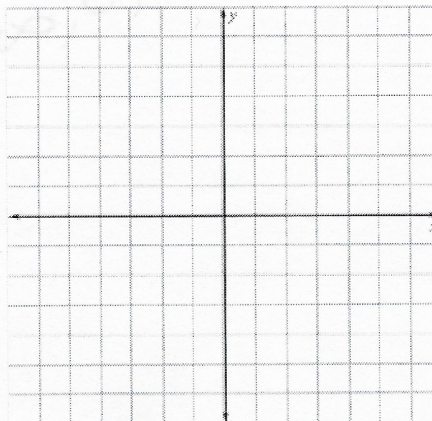


$D: (-\infty, \infty)$

$R: (0, \infty)$

b.)  $y = \left(\frac{1}{2}\right)^x$

x	y

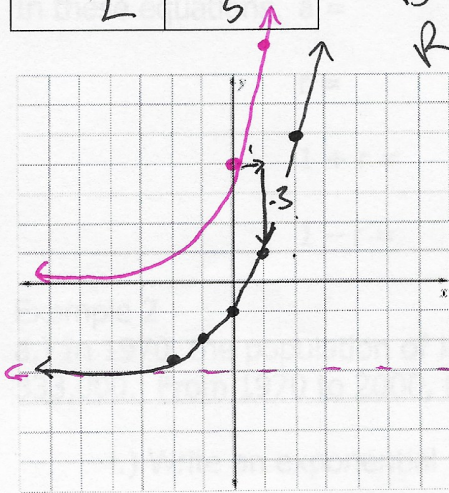




c.)  $y = 4 \cdot 2^{x-1} - 3$   
 ← right 1  
 ← down 3  
 growth

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

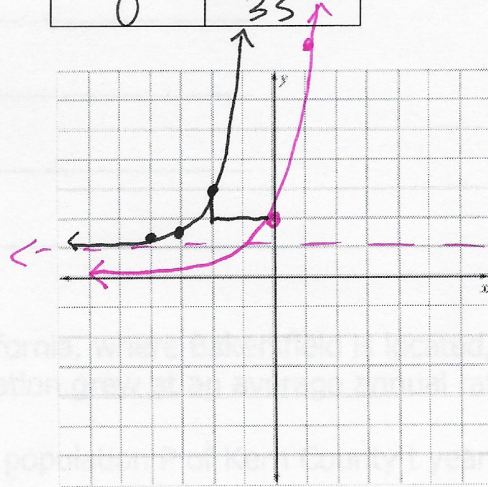
$y = 4 \cdot 2^x$   
 (0, 4)  
 (1, 8)  
 D:  $(-\infty, \infty)$   
 R:  $(-3, \infty)$



d.)  $y = 2 \cdot 4^{x+2} + 1$   
 ← left 2  
 up 1

x	y
-4	1.13
-3	1.5
-2	3
-1	9
0	33

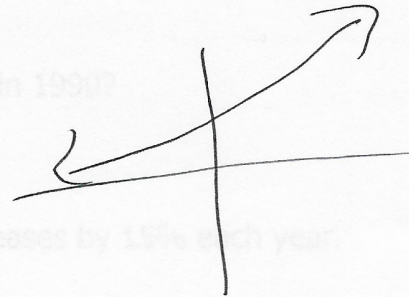
$y = 2 \cdot 4^x$   
 (0, 2)  
 (1, 8)  
 growth (4 > 1)  
 D:  $(-\infty, \infty)$   
 R:  $(-1, \infty)$



e.)  $y = -2 \left(\frac{3}{4}\right)^{x+1}$   
 reflection

x	y
-3	-3.56
-2	-2.67
-1	-2
0	-1.5
1	-1.13

$y = -2 \left(\frac{3}{4}\right)^x$   
 (0, -2)  
 (1, -6/4)  
 decay



D:  $(-\infty, \infty)$   
 R:  $(-\infty, 0)$

