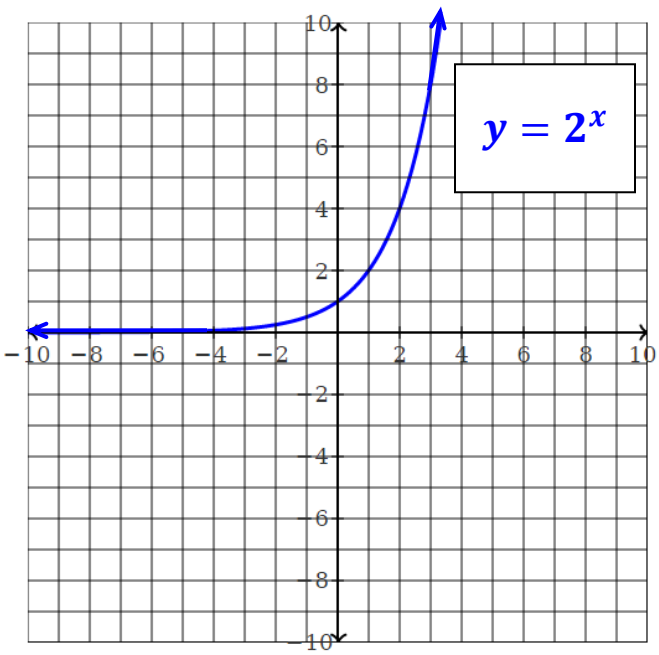
Name_____

EXPONENTIAL FUNCTIONS

An **exponential function** is a function written in the form $y = a \cdot b^x$

Examples		Nonexamples	
$y = 4^x$ $y = \left(\frac{1}{3}\right)^x$ $y = 2 \cdot 3^x$ $y = 13(0.2)^x$	In each of these examples, where is the variable x?	$y = 3x + 2$ $y = \frac{1}{2}x$	_____
		$y = x^2 + 3$ $y = 2x^2$	_____

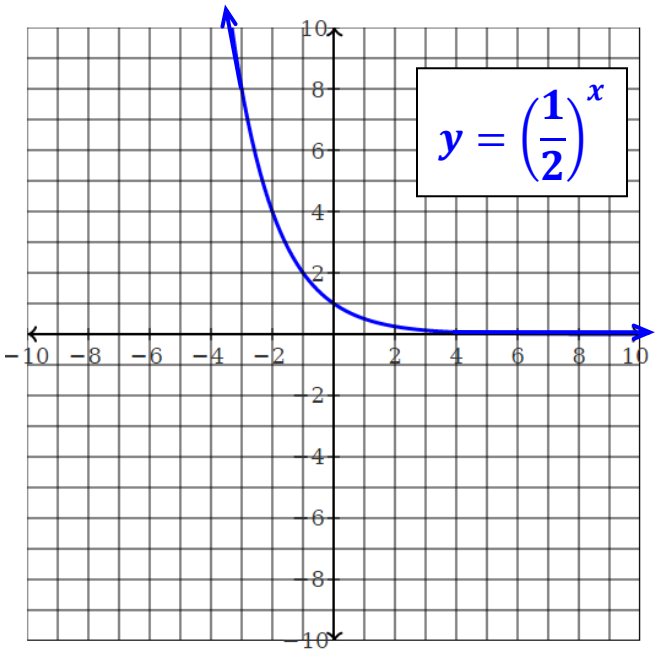
Notice that in each example below, the graph approaches the x-axis, but does not cross. Because of this, the x-axis is called an **asymptote**, a line a function gets close to but does not touch.



b = _____ Increasing / Decreasing

Domain: _____ Range: _____

Asymptote: _____



b = _____ Increasing / Decreasing

Domain: _____ Range: _____

Asymptote: _____

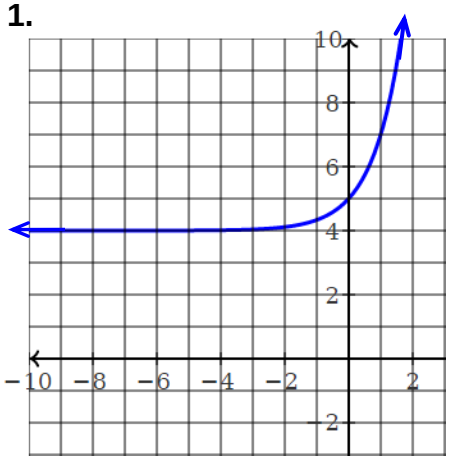
In the exponential function $y = a \cdot b^x$,

If **b > 1**, the graph is _____ from left to right.

If **0 < b < 1**, the graph is _____ from left to right.

Determine the domain, range, and asymptote of the following functions.

1.

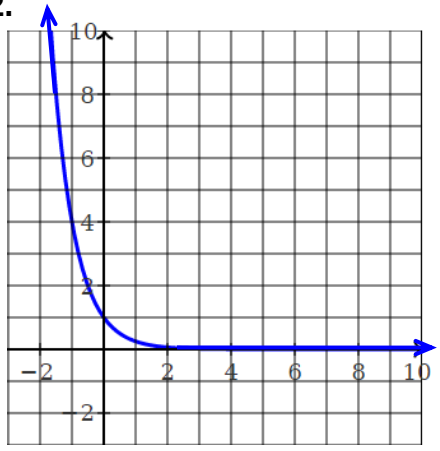


D: _____ R: _____

Asymptote: _____

Increasing / Decreasing

2.

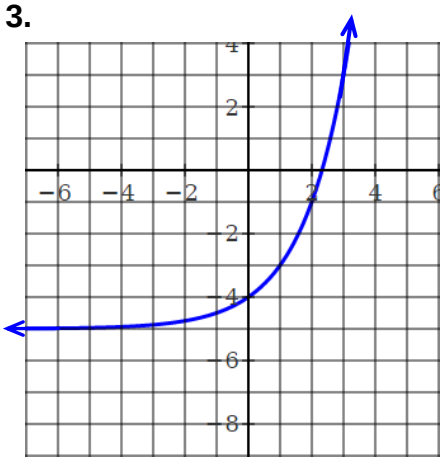


D: _____ R: _____

Asymptote: _____

Increasing / Decreasing

3.



D: _____ R: _____

Asymptote: _____

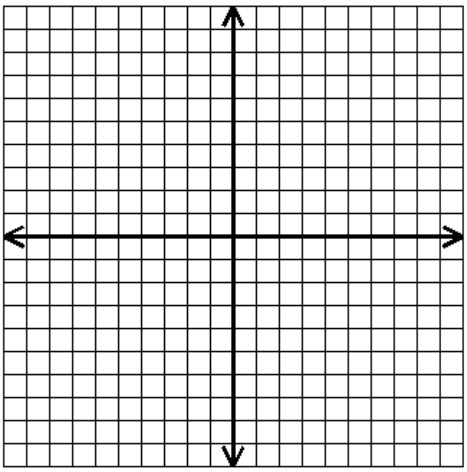
Increasing / Decreasing

Match each of the following to the correct description.

_____	4. $y = 3^x$	A. Decreasing, Asymptote: y = 0
_____	5. $y = (0.3)^x + 3$	B. Decreasing, Asymptote: y = 3
_____	6. $y = 3^x + 3$	C. Increasing, Asymptote: y = 0
_____	7. $y = (0.3)^x$	D. Increasing, Asymptote: y = 3

Graph each of the following functions.

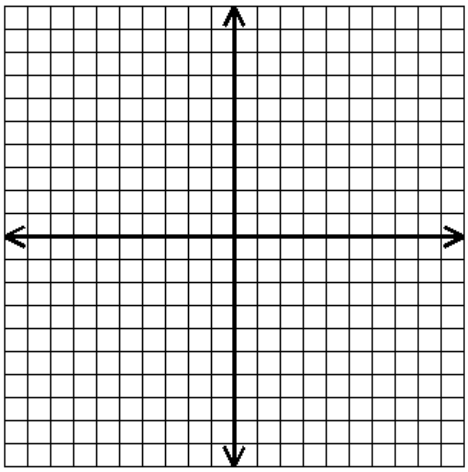
8. f(x) = 2x



Shape: _____

Function type: _____

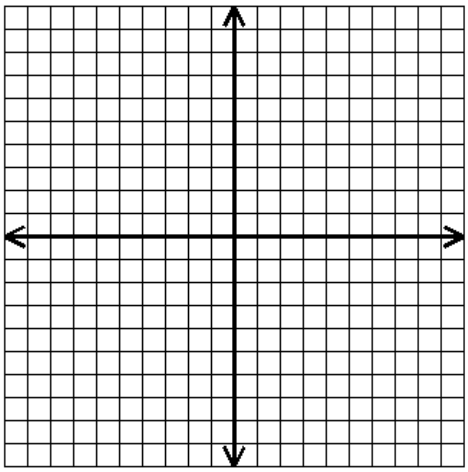
9. $g(x) = x^2$



Shape: _____

Function type: _____

10. $h(x) = 2^x$



Shape: _____

Function type: _____