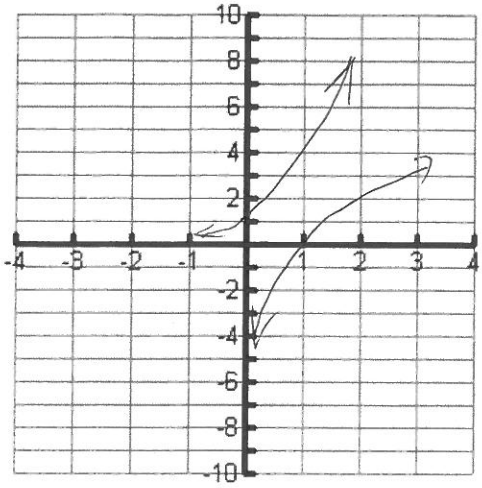
Exponential and Logarithmic Exploration WS KEY Name _____

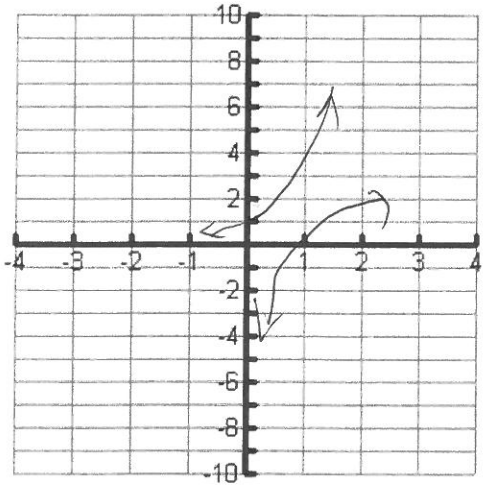
Date _____ Per. ____

1. Graph each of the following functions on the same graph. Then find the following characteristics about each graph. Write "**none**" if it does not exist.



$y = 2^x$	$y = \log_2 x$
Domain All Reals	Domain $x > 0$
Range $y > 0$	Range All Reals
x-intercept None	x-intercept $(1, 0)$
y-intercept $(0, 1)$	y-intercept None
Equation of asymptote $y = 0$	Equation of asymptote $x = 0$
End behavior	End behavior
As $x \to -\infty$, $f(x) \to$ 0	As $x \to 0$, $f(x) \to$ $-\infty$
As $x \to +\infty$, $f(x) \to$ $+\infty$	As $x \to +\infty$, $f(x) \to$ $+\infty$

2. Graph each of the following functions on the same graph. Then find the following characteristics about each graph. Write "**none**" is it does not exist.



$y = e^x$	$y = \ln x$
Domain All Reals	Domain $x > 0$
Range $y > 0$	Range All Reals
x-intercept None	x-intercept $(1, 0)$
y-intercept $(0, 1)$	y-intercept None
Equation of asymptote $y = 0$	Equation of asymptote $x = 0$
End behavior	End behavior
As $x \to -\infty$, $f(x) \to$ 0	As $x \to 0$, $f(x) \to$ $-\infty$
As $x \to +\infty$, $f(x) \to$ $+\infty$	As $x \to +\infty$, $f(x) \to$ $+\infty$

What do you notice about the graphs of the two functions in problem #1?

Symmetric with $y = x$

What do you notice about the graphs of the two functions in problem #2?

Same

These functions are Inverses of each other.