**Transformations of Exponential Functions**

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The equation for an exponential function can be written in the $f(x)=a\*b^{x}$

$f(x+k)=a\*b^{x+k}$ Translates the exponential function k units \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

$f\left(x-k\right)=a\*b^{x-k}$ Translates the exponential function k units \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

$f\left(x\right)+k=a\*b^{x}+k$ Translates the exponential function k units \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

$f\left(x\right)-k=a\*b^{x}-k$ Translates the exponential function k units \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Examples

1. Given the exponential function $f\left(x\right)=2^{x}$…
	1. Write a rule that will move the graph up three units.
	2. Write a rule that will move the graph to the left four units.
	3. Write a rule that will move the graph to the right five units.
	4. Write a rule that will move the graph down two units.
	5. Write a rule that will move the graph to the left three units and up six units.
2. Given the exponential function $h\left(x\right)=2\*3^{x}$, describe the transformations that the function went through to provide the following equations
	1. $f\left(x\right)=2\*3^{x+3}$
	2. $f\left(x\right)=2\*3^{x}-4$
	3. $f\left(x\right)=2\*3^{x-2}+6$
	4. $f\left(x\right)=2\*3^{x-1}-5$

Independent Practice

1. Given the exponential function $f\left(x\right)=3^{x}$…
	1. Write a rule that will move the graph up four units.
	2. Write a rule that will move the graph to the left seven units.
	3. Write a rule that will move the graph to the right ten units.
	4. Write a rule that will move the graph down three units.
	5. Write a rule that will move the graph to the left nine units and up one unit.
2. Given the exponential function $h\left(x\right)=4\*0.5^{x}$, describe the transformations that the function went through to provide the following equations
	1. $f\left(x\right)=4\*0.5^{x-12}$
	2. $f\left(x\right)=4\*0.5^{x}+2$
	3. $f\left(x\right)=4\*0.5^{x+6}+8$
	4. $f\left(x\right)=4\*0.5^{x+2}-4$