

For each function, complete the table, graph the function, then indicate the transformation.

I. Vertical and Horizontal Stretch and Compression.

$$y = |x|$$

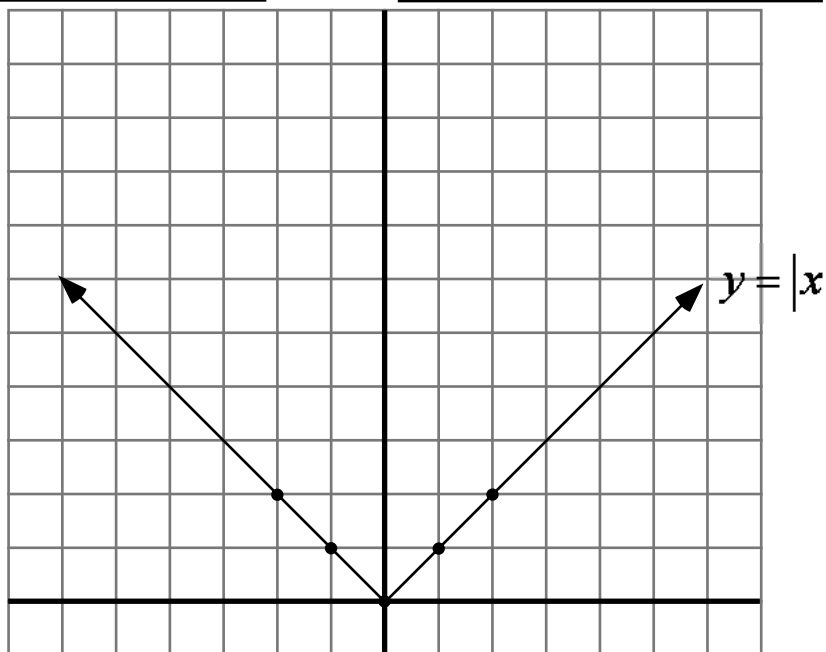
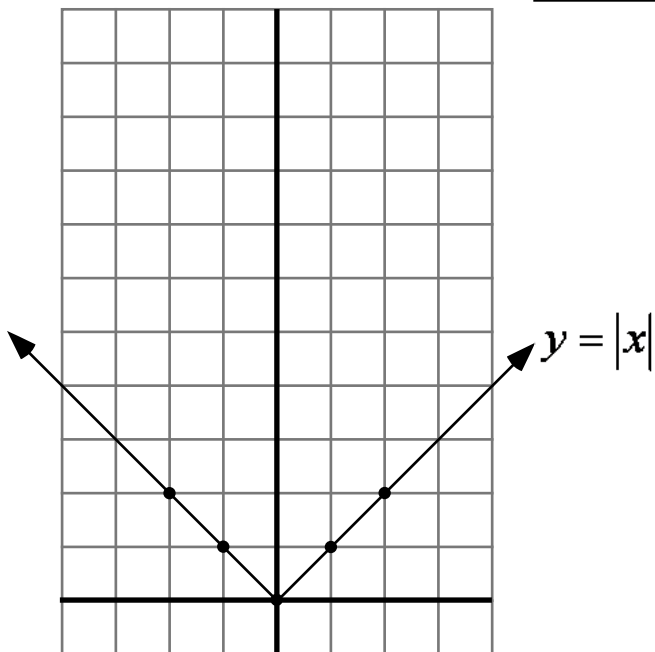
	x	y	
$\Delta X$	-2	2	$\Delta y$
+1 <	-1	1	> -1
+1 <	0	0	> -1
vertex			
+1 <	1	1	> +1
+1 <	2	2	> +1

$$y = 3|x|$$

	x	y	
$\Delta X$			$\Delta y$
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>
vertex			
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>

$$y = \frac{1}{2}|x|$$

	x	y	
$\Delta X$			$\Delta y$
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>
vertex			
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>

$$y = |x|$$

	x	y	
$\Delta X$	-2	2	$\Delta y$
+1 <	-1	1	> -1
+1 <	0	0	> -1
vertex			
+1 <	1	1	> +1
+1 <	2	2	> +1

$$y = |2x|$$

	x	y	
$\Delta X$		2	$\Delta y$
<input type="text"/> <		1	> -1
<input type="text"/> <		0	> -1
vertex			
<input type="text"/> <		1	> +1
<input type="text"/> <		2	> +1

$$y = \frac{1}{3}|x|$$

	x	y	
$\Delta X$		2	$\Delta y$
<input type="text"/> <		1	> -1
<input type="text"/> <		0	> -1
vertex			
<input type="text"/> <		1	> +1
<input type="text"/> <		2	> +1

## II. Vertical and Horizontal Translations.

$y = |x|$

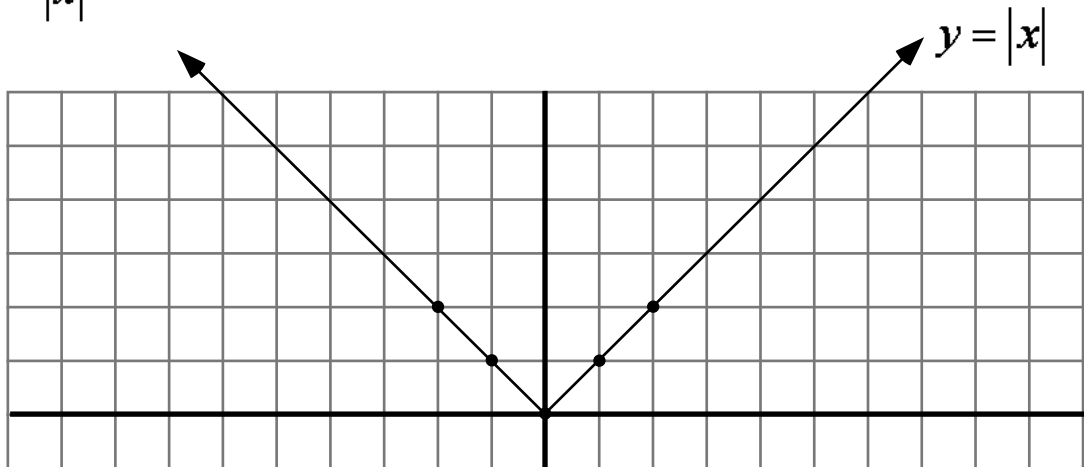
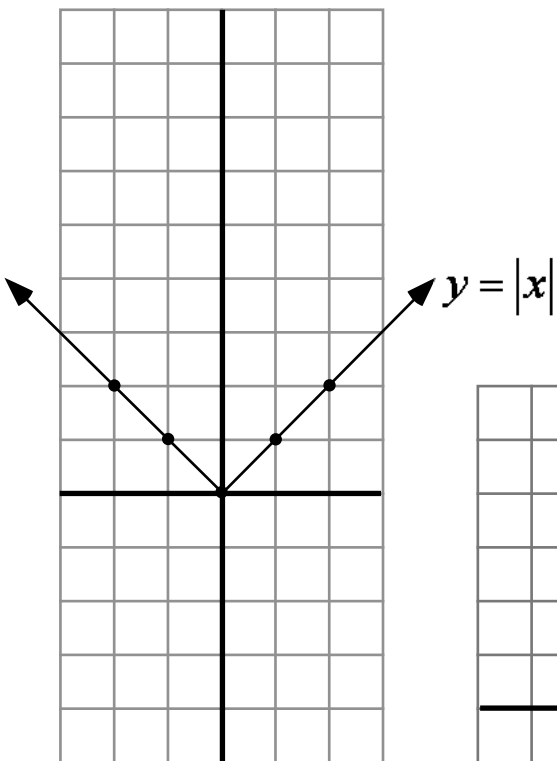
	x	y	
$\Delta X$	-2	2	$\Delta y$
+1 <	-1	1	> -1
+1 <	0	0	> -1
vertex	0	0	> +1
+1 <	1	1	> +1
+1 <	2	2	> +1

$y = |x| - 4$

	x	y	
$\Delta X$			$\Delta y$
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>
vertex			> <input type="text"/>
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>

$y = |x| + 5$

	x	y	
$\Delta X$			$\Delta y$
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>
vertex			> <input type="text"/>
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>

$y = |x|$

	x	y	
$\Delta X$	-2	2	$\Delta y$
+1 <	-1	1	> -1
+1 <	0	0	> -1
vertex	0	0	> +1
+1 <	1	1	> +1
+1 <	2	2	> +1

$y = |x - 4|$

	x	y	
$\Delta X$			$\Delta y$
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>
vertex			> <input type="text"/>
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>

$y = |x + 5|$

	x	y	
$\Delta X$			$\Delta y$
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>
vertex			> <input type="text"/>
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>

### III. Reflection across the x-axis.

$$y = |x|$$

	x	y	
$\Delta X$	-2	2	$\Delta y$
+1 <	-1	1	> -1
+1 <	0	0	> -1
vertex	0	0	> +1
+1 <	1	1	> +1
+1 <	2	2	> +1

$$y = -|x|$$

	x	y	
$\Delta X$			$\Delta y$
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>
vertex			> <input type="text"/>
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>

$$y = |x|$$

	x	y	
$\Delta X$	-2	2	$\Delta y$
+1 <	-1	1	> -1
+1 <	0	0	> -1
vertex	0	0	> +1
+1 <	1	1	> +1
+1 <	2	2	> +1

$$y = -3 \left| \frac{1}{2}(x-4) \right| + 5$$

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

$$y = |x| + 2$$

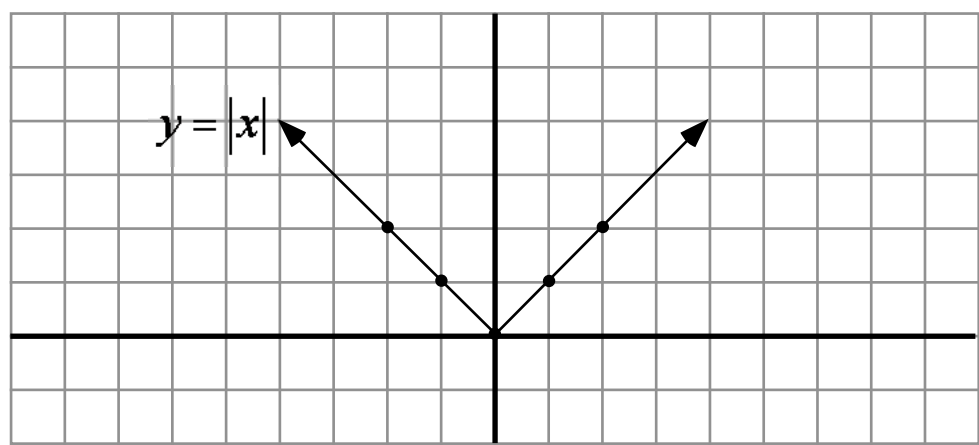
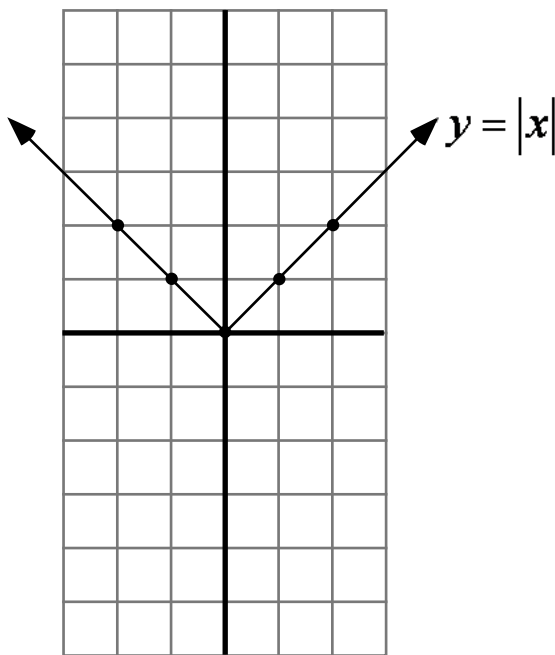
	x	y	
$\Delta X$			$\Delta y$
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>
vertex			> <input type="text"/>
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>

$$y = -|x| + 2$$

	x	y	
$\Delta X$			$\Delta y$
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>
vertex			> <input type="text"/>
+1 <			> <input type="text"/>
+1 <			> <input type="text"/>

	x	y	
$\Delta X$			$\Delta y$
<input type="text"/> <			> <input type="text"/>
<input type="text"/> <			> <input type="text"/>
vertex			> <input type="text"/>
+2 <			> -3
<input type="text"/> <			> <input type="text"/>

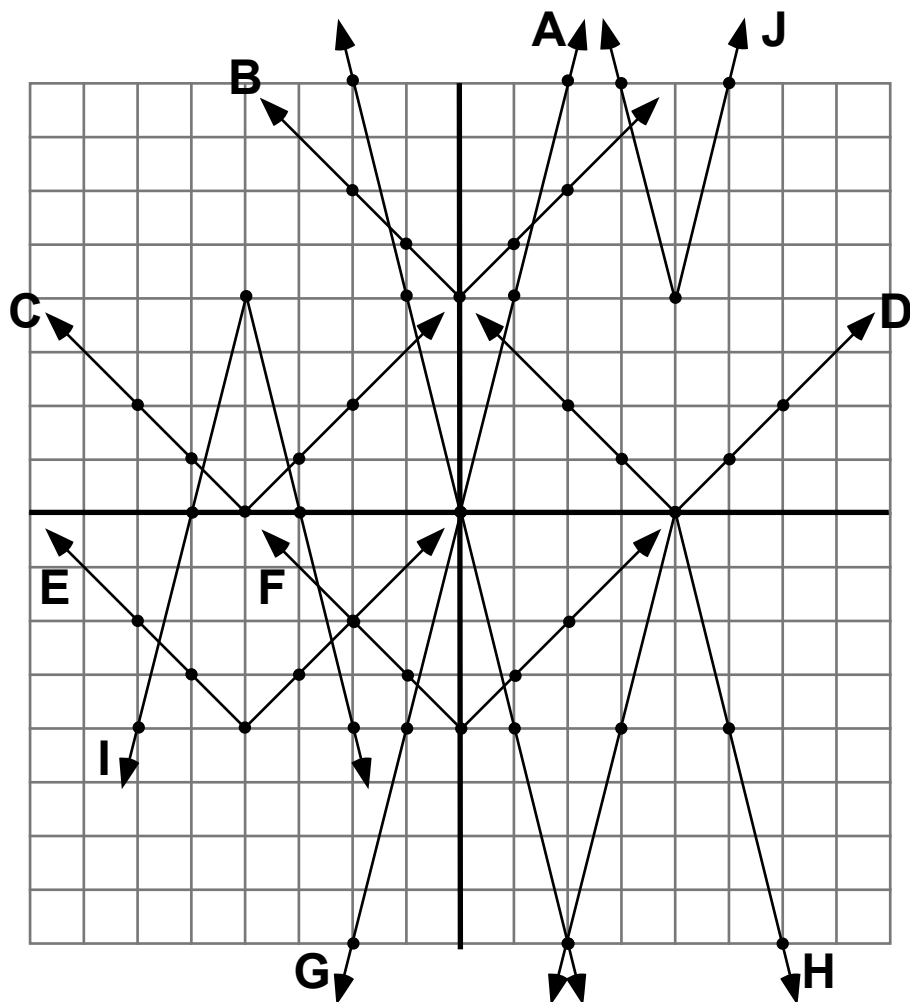
	x	y	
$\Delta X$			$\Delta y$
<input type="text"/> <			> <input type="text"/>
<input type="text"/> <			> <input type="text"/>
vertex			> <input type="text"/>
+3 <			> $+\frac{1}{2}$
<input type="text"/> <			> <input type="text"/>



V. Complete the following exercises by matching the graph to its corresponding equation (a) and finding the correct equation for the given graphs (b). Assume that the graphs have been only vertically stretched/compressed in (b).

(a)

- \_\_\_  $y = 4|x|$
- \_\_\_  $y = |x + 4|$
- \_\_\_  $y = |x| + 4$
- \_\_\_  $y = -4|x - 4|$
- \_\_\_  $y = |x - 4|$
- \_\_\_  $y = |x| - 4$
- \_\_\_  $y = -4|x|$
- \_\_\_  $y = -4|x + 4| + 4$
- \_\_\_  $y = 4|x - 4| + 4$
- \_\_\_  $y = |x + 4| - 4$



(b)

- A \_\_\_\_\_
- B \_\_\_\_\_
- C \_\_\_\_\_
- D \_\_\_\_\_
- E \_\_\_\_\_
- F \_\_\_\_\_
- G \_\_\_\_\_
- H \_\_\_\_\_
- I \_\_\_\_\_
- J \_\_\_\_\_

