

The Absolute Value Function

Name Key
Date _____ Block _____

The Parent Function: $f(x) = |x|$
...where $a = 1$; $h = 0$; $k = 0$

Graphic Form of the Function

$$f(x) = a|x - h| + k$$

Translations

The VERTEX is (h, k)

- h shifts $f(x)$ to the left h units
- +h shifts $f(x)$ to the right h units
- k shifts $f(x)$ up k units
- k shifts $f(x)$ down k units

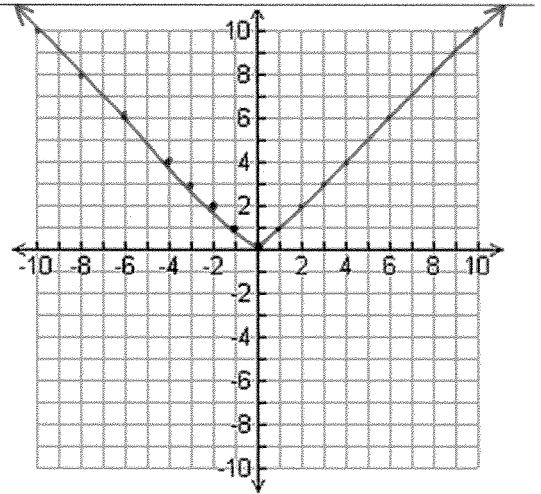
Reflections & Dilations

"a" is the "rate" of $f(x)$

- +a opens upward
- a opens downward
- $0 < a < 1$ vertical compression
- $a > 1$ vertical stretch

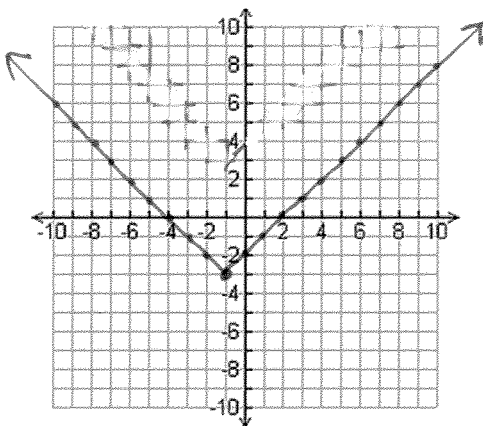
$f(x) = |x|$

x	y = f(x)
-4	4
-3	3
-2	2
-1	1
0	0
1	1
2	2
3	3
4	4

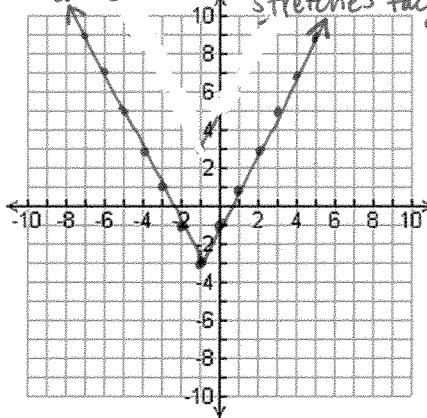


State the vertex and describe the dilation and/or reflection BEFORE you graph each function.

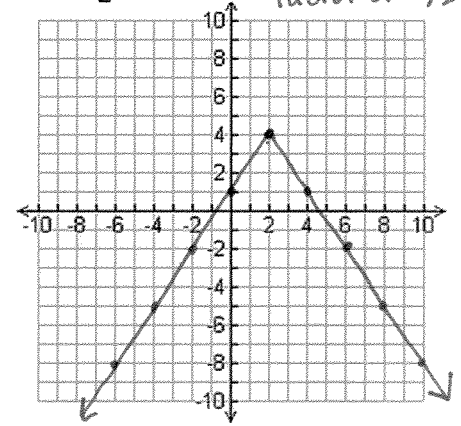
1. $y = |x + 1| - 3$
vertex: $(-1, -3)$
 $a = 1$



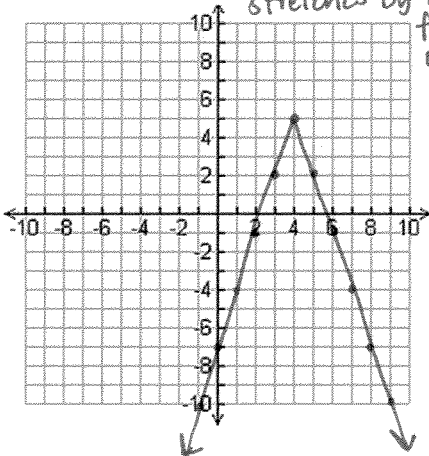
2. $y = 2|x + 1| - 3$
 $a = 2$
vertex: $(-1, -3)$ by stretches factor of 2



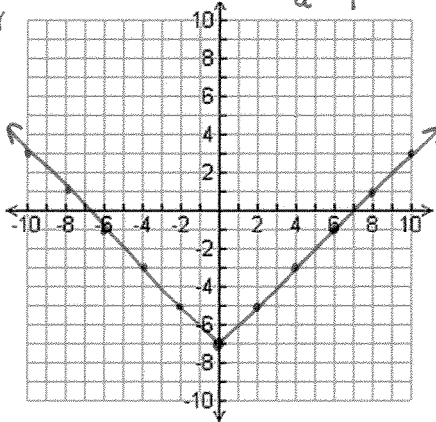
3. $y = -\frac{3}{2}|x - 2| + 4$
 $a = -\frac{3}{2}$
vertex: $(2, 4)$
reflects
stretches by a factor of $\frac{3}{2}$



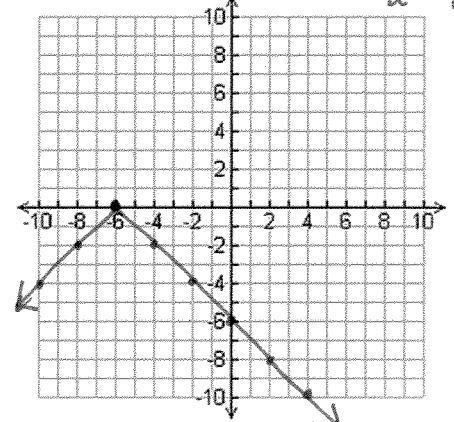
4. $y = -3|x - 4| + 5$
 $a = -3$
vertex: $(4, 5)$
reflects
stretches by a factor of 3



5. $f(x) = |x| - 7$
vertex: $(0, -7)$
 $a = 1$



6. $f(x) = -|x + 6|$
vertex: $(-6, 0)$
reflects
 $a = -1$



The Identity / Linear Function

Name _____

Date _____ Block _____

The Parent Function: $f(x) = x$
 ...where $a = 1$; $h = 0$; $k = 0$

Graphic Form of the Function

$$f(x) = a(x - h) + k$$

which is the same as...

Point-Slope $y = m(x - x_1) + y_1$

Three forms of a Linear Function:

- Slope-Intercept: $y = mx + b$

- Standard: $Ax + By = C$

- Point-Slope: $y = m(x - x_1) + y_1$

Translations

The VERTEX is (h, k)

-h shifts $f(x)$ to the left h units

+h shifts $f(x)$ to the right h units

k shifts $f(x)$ up k units

-k shifts $f(x)$ down k units

Reflections & Dilations

"a" is the "rate" of $f(x)$

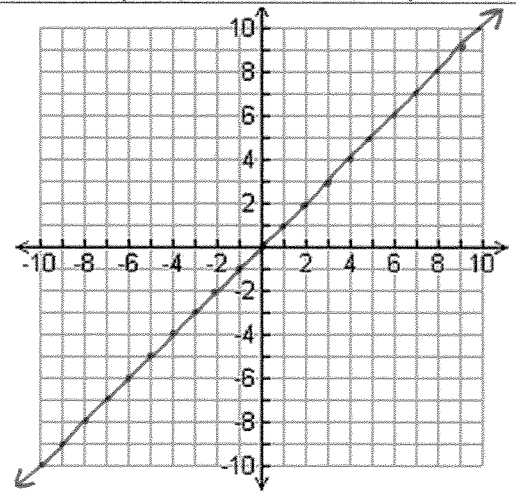
+a rises

-a falls

$0 < a < 1$ vertical compression

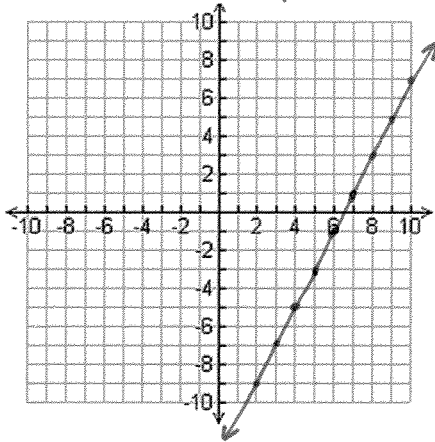
$a > 1$ vertical stretch

x	y = f(x)
-4	-4
-3	-3
-2	-2
-1	-1
0	0
1	1
2	2
3	3
4	4

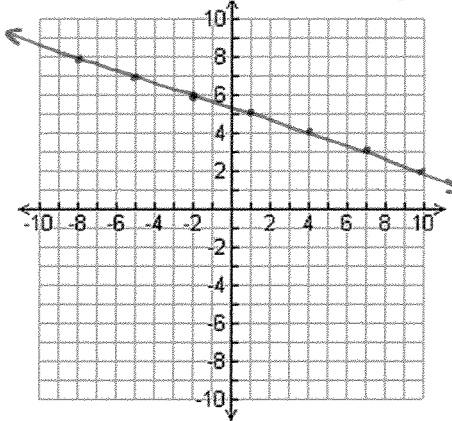


State a point and the slope BEFORE you graph each line. Do not use a calculator!

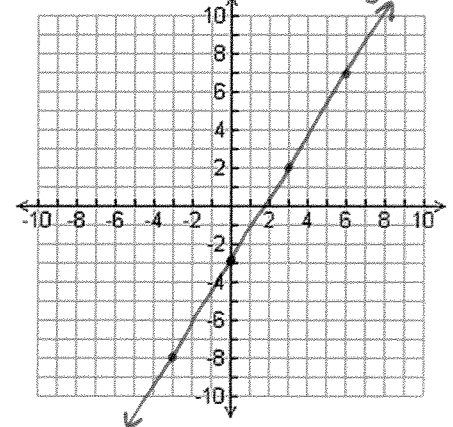
1. $y = 2(x - 4) - 5$ pt: $(4, -5)$
slope = 2



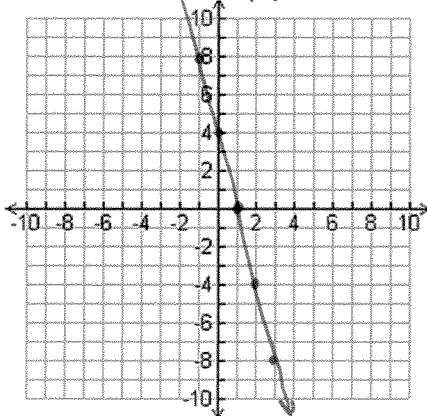
2. $y = -\frac{1}{3}(x + 2) + 6$ pt: $(-2, 6)$
slope = $-\frac{1}{3}$



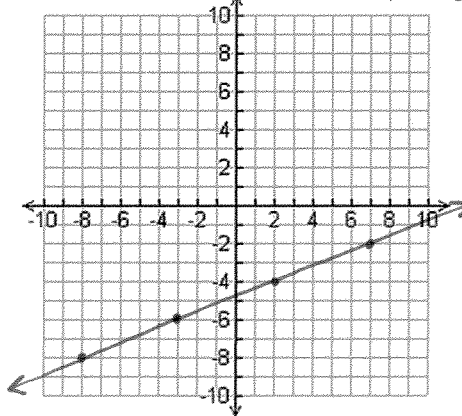
3. $y = \frac{5}{3}(x - 3) + 2$ pt: $(3, 2)$
slope = $\frac{5}{3}$



4. $f(x) = -4(x - 1)$ pt: $(1, 0)$
slope = -4



5. $f(x) = \frac{2}{5}(x + 3) - 6$ pt: $(-3, -6)$
slope = $\frac{2}{5}$



6. $y = -5$

