

Name _____ Date _____ Period _____

Transformations of $f(x) = |x|$, Part II

Algebra II | Unit 2 | Day 3 | TEK A2.6.C

Objective: I can describe and graph the effect of c and d on $f(x) = a|x-c|+d$, and combine all four transformations into one function.

Vocabulary

Horizontal shift: $f(x-c)$ moves the graph left/right, _____ the sign of c .

Vertical shift: $f(x)+d$ moves the graph up/down, _____ the sign of d .

KEY IDEA

For $f(x) = a|x - c| + d$, the vertex is always at _____.

c shifts horizontally, OPPOSITE its sign: $x - 3 \rightarrow$ right 3, $x + 2 \rightarrow$ left 2.

d shifts vertically, SAME as its sign: $+4 \rightarrow$ up 4, $-5 \rightarrow$ down 5.

Let's Work Through It

Example 1 — Give the shift and vertex of $f(x) = |x - 3|$.

Shift: _____ Vertex: _____

Example 2 — Give the shift and vertex of $f(x) = |x + 2|$.

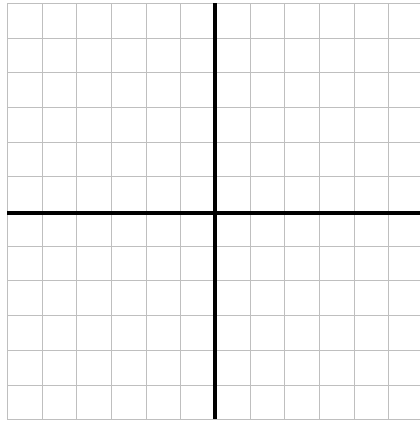
Shift: _____ Vertex: _____

Example 3 — Give the vertex of $f(x) = |x| + 4$, then the vertex of $f(x) = |x| - 5$.

$f(x) = |x| + 4$: _____ $f(x) = |x| - 5$: _____

Example 4 — "Compressed by $\frac{1}{3}$, shifted down 5, shifted left 2" - write it as one function, give its vertex, then graph it. Each square is 1 unit; both axes run -6 to 6.

$f(x) =$ _____ Vertex: _____



Example 5 — Dunhill Drafting's roofline was modeled by $f(x) = -1.2|x - 3| + 8$. Give the vertex (the roof's highest point) and describe the transformations.

Vertex: _____

Transformations:

Your Turn

You Try 1 — Give the vertex of $f(x) = -2|x - 1| + 6$, and describe its transformations from the parent.

Vertex: _____

Transformations:

You Try 2 — True or False: every function of the form $a|x - c| + d$ has the SAME shape as the parent, just moved and resized. Explain.
