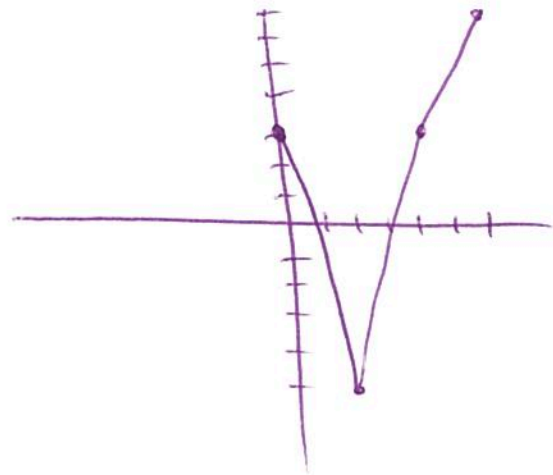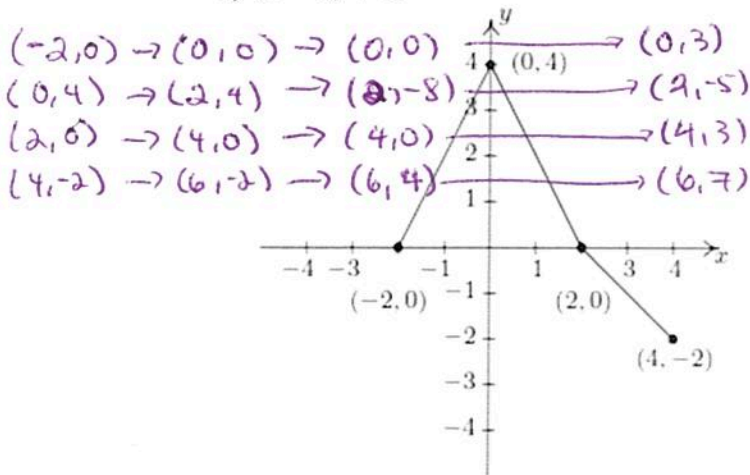　　　　　Name _____ **KEY**

Instructions: Show all work. Use exact answers unless otherwise asked to round.

1. Write the function $f(x) = \sqrt{x}$ after it has undergone the following transformations. Your final equation should include all the transformations.
   a. Horizontal shift to the right of 2　　$\sqrt{x-2}$
   b. Vertical reflection　　$-\sqrt{x-2}$
   c. Vertical stretch by 3　　$-3\sqrt{x-2}$
   d. Vertical shift down by 5

   $$g(x) = -3\sqrt{x-2} - 5$$

2. Given the graph of the function $f(x)$ below, draw the graph of the function $g(x) = -2f(x-2) + 3$.

$(-2,0) \rightarrow (0,0) \rightarrow (0,0)$　　$\rightarrow (0,3)$
$(0,4) \rightarrow (2,4) \rightarrow (2,-8)$　　$\rightarrow (2,-5)$
$(2,0) \rightarrow (4,0) \rightarrow (4,0)$　　$\rightarrow (4,3)$
$(4,-2) \rightarrow (6,-2) \rightarrow (6,4)$　　$\rightarrow (6,7)$

Graph points labeled: $(0,4)$, $(-2,0)$, $(2,0)$, $(4,-2)$

3. Find an equation of the line with the following properties: Passing through the points $(-3,-4)$ and $(2,5)$. Write the solution in:
   a. Standard form　　$9x - 5y = -7$

   $m = \dfrac{-4-5}{-3-2} = \dfrac{-9}{-5} = \dfrac{9}{5}$

   b. Slope-intercept form　　$y = \dfrac{9}{5}x + \dfrac{7}{5}$

   $y + 4 = \dfrac{9}{5}(x+3)$
   $y + 4 = \dfrac{9}{5}x + \dfrac{27}{5}$

   c. As a function　　$f(x) = \dfrac{9}{5}x + \dfrac{7}{5}$

   $y = \dfrac{9}{5}x + \dfrac{7}{5}$

   $-\dfrac{9}{5}x + y = \dfrac{7}{5}$　　(-5)

   $9x - 5y = -7$

$$3y = -4x + 24$$
$$y = -\frac{4}{3}x + 8$$

4. Given the equation $4x + 3y = 24$, write an equation of a line with the following properties:
   a. A line parallel to the original line passing through the point (4.-2).

$$m = -\frac{4}{3}$$

$$y + 2 = -\frac{4}{3}(x - 4) \rightarrow y + 2 = -\frac{4}{3}x + \frac{16}{3} \rightarrow y = -\frac{4}{3}x + \frac{10}{3}$$

   b. A line perpendicular to the original line passing through the point (-3,1).

$$m = \frac{3}{4}$$

$$y - 1 = \frac{3}{4}(x + 3) \rightarrow y - 1 = \frac{3}{4}x + \frac{9}{4} \rightarrow y = \frac{3}{4}x + \frac{13}{4}$$

5. Solve the equation $|2 - 5x| = 5|x + 1|$.

$$2 - 5x = 5(x + 1) \qquad \text{or} \qquad 2 - 5x = -5(x + 1)$$
$$2 - 5x = 5x + 5 \qquad\qquad\qquad 2 - 5x = -5x - 5$$
$$-10x = 3 \qquad\qquad\qquad\qquad 2 \neq -5$$
$$x = -\frac{3}{10}$$

$$x = \left\{ -\frac{3}{10} \right\}$$