ALGEBRA 2
Unit 4, Test 2 REVIEW

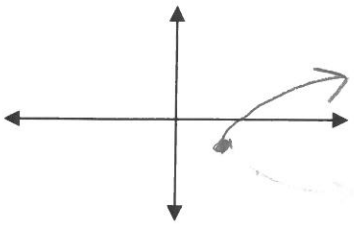
Name Key Block ____

Shifting from the Parent Graph
For each equation below, provide the information requested and **SKETCH** the graph (labeling the important point).

1) $f(x) = \sqrt{x-2} - 1$ a) Locator Point: $(2, -1)$

b) Compressed or Stretched or (Neither) c) Flipped – Yes or (No)

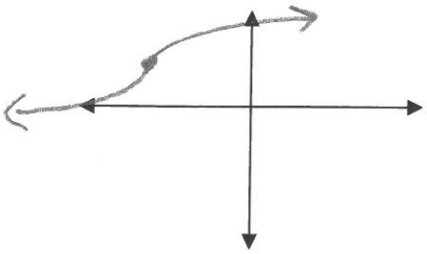
c) Domain: $[2, \infty)$ d) Range: $[-1, \infty)$



2) $f(x) = \sqrt[3]{x+5} + 2$ a) Locator Point: $(-5, 2)$

b) Compressed or Stretched or (Neither) c) Flipped – Yes or (No)

c) Domain: $(-\infty, \infty)$ d) Range: $(-\infty, \infty)$



3) The graph of $y = \sqrt{x}$ is shifted 8 units right and 2 units up. Which is the equation of the translated function? (Circle One)

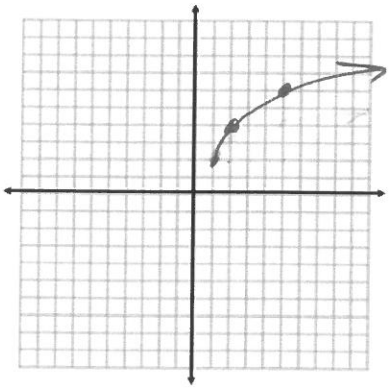
a) $y = \sqrt{x-8} - 2$ b) $y = \sqrt{x+8} - 2$ (c) $y = \sqrt{x-8} + 2$ d) $y = \sqrt{x+8} + 2$

4) What are the domain and range of the function $y = -\sqrt{x-3}$? (Circle One)

a) Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$ (b) Domain: $[3, \infty)$ Range: $(-\infty, 0]$

c) Domain: $[3, \infty)$ Range: $(-\infty, \infty)$ d) Domain: $(-\infty, \infty)$ Range: $[0, -\infty)$

5) Investigate Square Root



$f(x) = 2\sqrt{x-1} + 2$ _____ Parent Function: $f(x) = \sqrt{x}$

Locator Point: $(1, 2)$

Domain: $[1, \infty)$

Range $[2, \infty)$

Compressed or (Stretched) or Neither? (Circle One)

Flipped – Yes or (No)? (Circle One)

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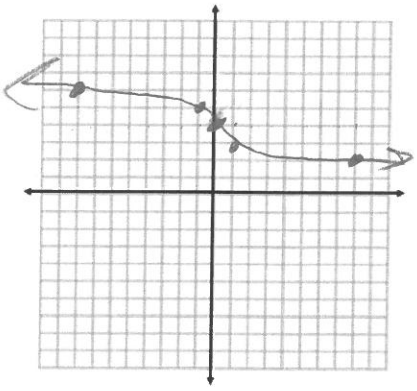
6) Investigate Cube Root $f(x) = -\sqrt[3]{x} + 4$



Parent Function: $f(x) = \sqrt[3]{x}$

Locator Point: $(0, 4)$

Domain: $(-\infty, \infty)$

Range $(-\infty, \infty)$

Compressed or Stretched or Neither? (Circle One)

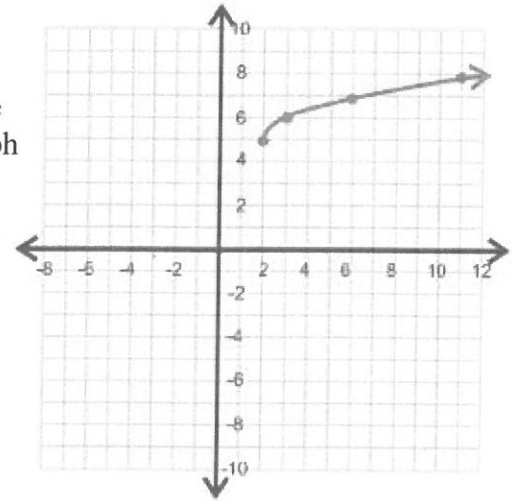
Flipped – Yes or No? (Circle One)

7) Does the graph on the right represent a square root function or a cube root function? Justify your reasoning.

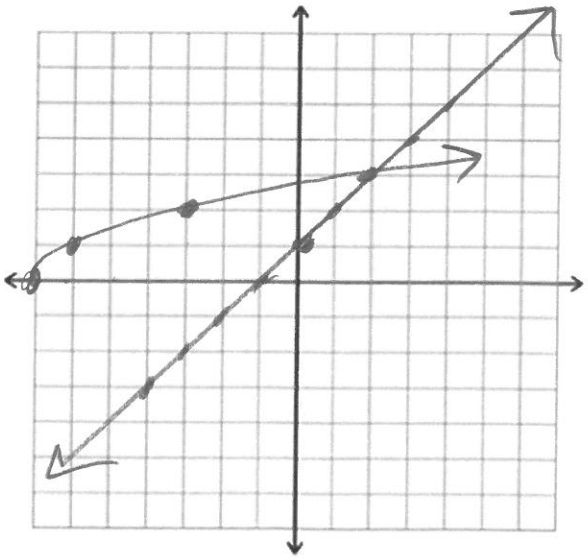
Sq. Rt. ; there is an endpt.

Write the equation of the type of function you chose. Be sure your graph and equation includes the points given on the graph to the right.

$y = \sqrt{x-2} + 5$



8) On the same grid, graph the functions: $f(x) = x + 1$ and $g(x) = \sqrt{x+7}$ to find the point of intersection. Label each graph and their intersection point.



Algebraically solve the equation $x + 1 = \sqrt{x+7}$.

$(x+1)^2 = (\sqrt{x+7})^2$

$x^2 + 2x + 1 = x + 7$

$x^2 + x - 6 = 0$

$(x+3)(x-2) = 0$

$x \neq 3$ or $x = 2$

How do your answers compare?

$(2, 3)$ both are

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Key

9) Given that $f(x) = (x-3)^2$ and $g(x) = \frac{2}{x+4}$. Simplify

a) $f(g(x))$

$f\left(\frac{2}{x+4}\right) = \left(\frac{2}{x+4} - 3\right)^2$

$= \left(\frac{2}{x+4}\right)^2 - \frac{12}{x+4} + 9$

ouch!

b) $g(f(-1)) = g(16)$

$= \frac{2}{16+4}$

$= \frac{2}{20}$

$= \frac{1}{10}$

c) $f(g(4)) = f\left(\frac{2}{8}\right)$

$= f\left(\frac{1}{4}\right)$

$= \left(\frac{1}{4} - 3\right)^2$

$= (-2.75)^2$

$= 7.5625$

10) Find the inverse of the functions:

a) $f(x) = \frac{-1}{x+3}$

$\frac{x}{1} = \frac{-1}{y+3}$

$\frac{1}{x} = \frac{y+3}{-1}$

$-\frac{1}{x} - 3 = y^{-1}$

b) $g(x) = \sqrt{x} + 3$

$x = \sqrt{y} + 3$

$x - 3 = \sqrt{y}$

$(x-3)^2 = (\sqrt{y})^2$

$y^{-1} = x^2 - 6x + 9$

c) $h(x) = (x-4)^2 - 15$

$x = (y-4)^2 - 15$

$x + 15 = (y-4)^2$

$\pm\sqrt{x+15} = y - 4$

$4 \pm \sqrt{x+15} = y^{-1}$

Solving Equations

11) Solve the equation and check your solutions:

a) $(2x+6)^{1/2} = 8$

$2x + 6 = 8^2$

$2x = 64 - 6$

$2x = 58$

$\boxed{x = 29}$

yes.

b) $-4\sqrt{2x} + 3 = -21$

$\frac{-4\sqrt{2x}}{-4} = \frac{-24}{-4}$

$\sqrt{2x} = 6$

$2x = 36$

$\boxed{x = 18}$

yes

c) $(2x+1)^{3/4} = 27$

$\left((2x+1)^{3/4}\right)^{4/3} = 27^{4/3}$

$2x + 1 = 3^4$

$2x + 1 = 81$

$2x = 80$

$\boxed{x = 40}$

yes

12) Solve the equation and **check for extraneous roots**:

a) $4\sqrt{x} - 1 = 3$

$4\sqrt{x} = 4$

$\sqrt{x} = 1$

$\boxed{x = 1}$

yes

b) $\sqrt{3x+7} = x - 1$

$3x + 7 = (x-1)^2$

$3x + 7 = x^2 - 2x + 1$

$x^2 - 5x - 6 = 0$

$(x-6)(x+1) = 0$

$\boxed{x = 6}$ or $x \neq -1$

c) $\sqrt[3]{2x+11} - \sqrt[3]{-x+10} = 0$

$\sqrt[3]{2x+11} = \sqrt[3]{-x+10}$

$2x + 11 = -x + 10$

$3x = -1$

$\boxed{x = -1/3}$