ALEGRBA RH **HW**

I. Identify the needed information from the equation of the transformed function.

a. $g(x) = -\sqrt{x-1}$

Name square root

Transformations reflection over x-axis
horizontal shift 1 unit right

b. $f(x) = \frac{1}{2}(x+10)^3 + 1$

Name cubic

Transformations vertical compression by a factor of $\frac{1}{2}$
horizontal shift 10 units left
vertical shift 1 unit up

c. $g(x) = -5|x| - 7$

Name absolute value

Transformations reflection over x-axis
vertical stretch by a factor of 5
vertical shift 7 units down

* Put in VERTEX form first*

d. $h(x) = x^2 + 10x - 2$

$\left(\frac{10}{2}\right)^2$

$y + 2 = x^2 + 10x$
$+25 \qquad +25$
$y + 27 = x^2 + 10x + 25$
$y = (x+5)^2 - 27$

Name quadratic

Transformations horizontal shift 5 units left
vertical shift 27 units down

e. $f(x) = 2x^2 - 16x + 3$

$y - 3 = 2x^2 - 16x$
$y - 3 = 2(x^2 - 8x \quad)$
$+32 \qquad +16$
$y + 29 = 2(x-4)^2$
$y = 2(x-4)^2 - 29$

Name quadratic

Transformations vertical stretch by a factor of 2
horizontal shift 4 units right
vertical shift 29 units down

II. Write an equation of a function given the name and transformations

a. Absolute Value: Vertically stretched by a factor of 4 , translated 3 units up

$y = 4|x| + 3$

b. Cube Root: Vertically stretched by a factor of 3.45 and shifted 4 units left and 8 units up

$y = 3.45\sqrt[3]{x+4} + 8$

c. Quadratic **(in standard form):** Vertically stretched by a factor of 2, reflected over the x-axis, translated 4 units down and 5 units left

$y = -2(x+5)^2 - 4$
$y = -2(x+5)(x+5) - 4$
$y = -2(x^2 + 10x + 25) - 4$

$y = -2x^2 - 20x - 50 - 4$
$y = -2x^2 - 20x - 54$

III. Write an equation of a new function given a ***NON PARENT*** function

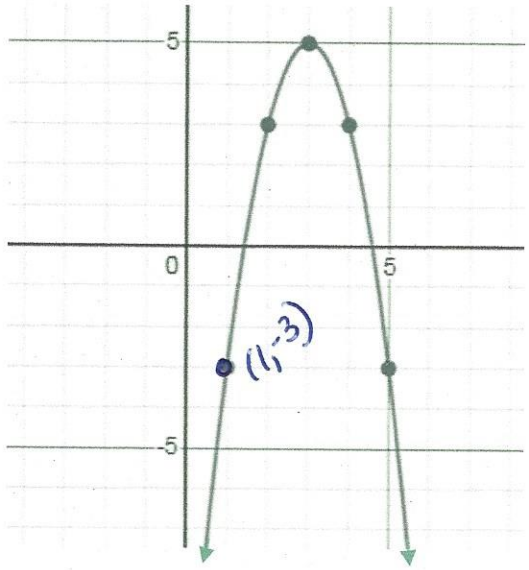
Given $y = -3(x-1)^2 + 3$: Shift is 8 units up, 9 units left and reflect it over the x-axis

add 8 to the back — add 9 inside — multiply front by a negative

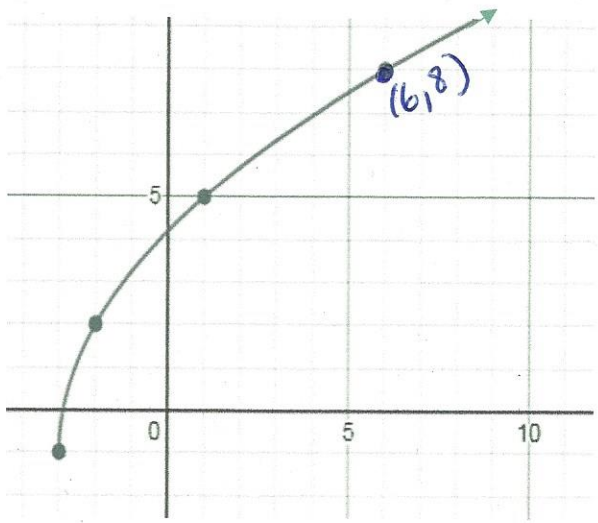
$y = 3(x+8)^2 + 11$

IV. Write an equation given the graph of the transformed function (Don't forget the "a" value)

A.



B.



vertex $(3,5)$

parent function $y = x^2$

$y = a(x-3)^2 + 5$

pick a point (not the vertex) from the graph to substitute into the equation; solve for a

$(1,-3)$

$-3 = a(1-3)^2 + 5$

$-3 = 4a + 5$

$-8 = 4a$

$a = -2$

$y = -2(x-3)^2 + 5$

enter in calc go to TOV (table of values) make sure the points on the above graph are in the table

starting point $(-3,-1)$

parent function $y = \sqrt{x}$

$y = a\sqrt{x+3} - 1$

substitute $(6,8)$

$8 = a\sqrt{6+3} - 1$

$8 = 3a - 1$

$9 = 3a$

$a = 3$

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