Name: MAURER Date: _____ Per: _____

W/S AA4-15: Finding Exact Equations

PART I. In each of the following problems, set up a "partial equation" using the locator point, then plug in the "passing through" point to find the stretch factor "a". Write the final equation including the stretch factor in the last column and sketch the graph.

EXAMPLE: Find the exact equation of a **hyperbola** with **locator point** at (2, 3) **passing through** (5, 4).

Set up partial equation of a hyperbola: $y = a\frac{1}{x-2}+3$

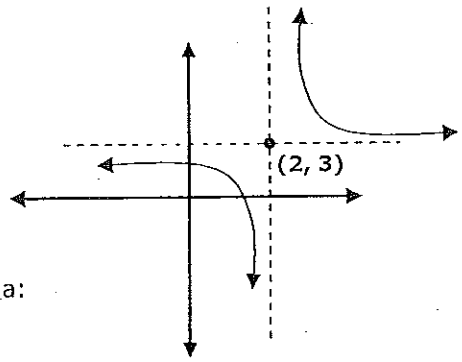
Plug in the "passing thru" point for x, y: $4 = a\frac{1}{5-2}+3$

Solve for "a": $1 = a\frac{1}{3}$

$1 = \frac{a}{3}$

$a = 3$

Write the final equation: $y = 3\frac{1}{x-2}+3$ and sketch the hyperbola:



Write the exact equation described below. Sketch each graph when done.

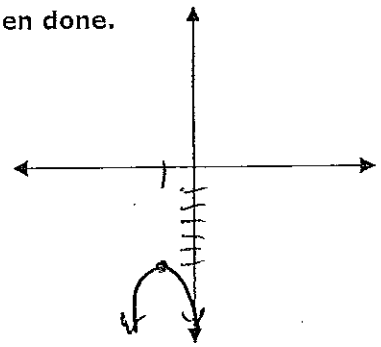
1) Quadratic, LP=(-1, -6), passing thru (0, -8)

$y = a(x+1)^2 - 6$

$-8 = a(1)^2 - 6$

$-2 = a$

$y = -2(x+1)^2 - 6$



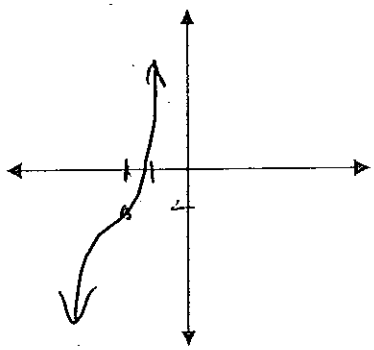
2) Cubic, LP=(-2, -1), passing thru (-1, 2)

$y = a(x+2)^3 - 1$

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

$3 = a$

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



3) Exponential, LP=(1, -2), passing thru (3, 10)

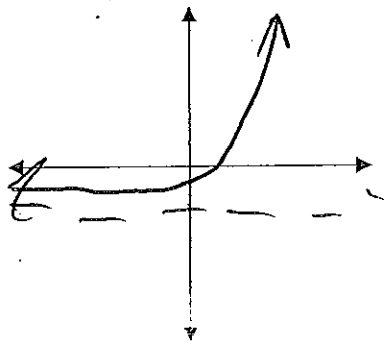
$y = a \cdot 2^{x-1} - 2$

$10 = a \cdot 2^2 - 2$

$12 = a \cdot 4$

$a = 3$

$y = 3 \cdot 2^{x-1} - 2$



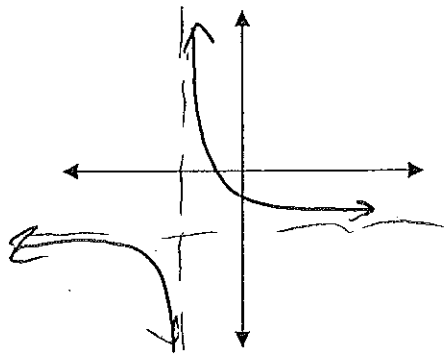
4) Hyperbola, LP=(-3, -4), passing thru (-4, -5)

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

$-5 = \frac{a}{-4+3} - 4$

$-1 = \frac{a}{-1}$

$1 = a$



5) Square root, LP=(-2, 0), passing thru (7, 8.25)

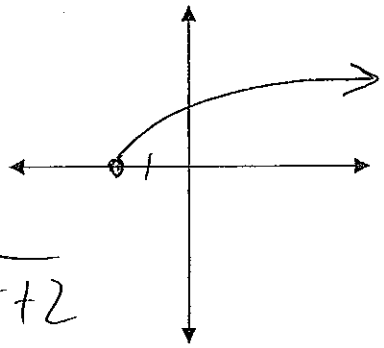
$y = a\sqrt{x+2}$

$8.25 = a\sqrt{9}$

$8.25 = a \cdot 3$

$\frac{8.25}{3} = a$

$y = 2.75\sqrt{x+2}$



6) Absolute Value, LP=(1, 3), passing thru (-3, -5)

$y = a|x-1| + 3$

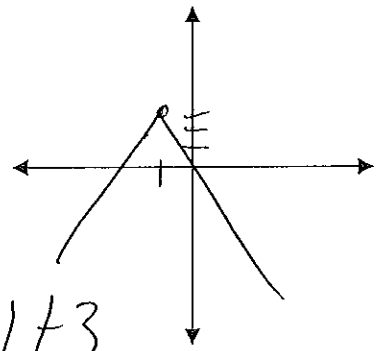
$-5 = a|-3-1| + 3$

$-5 = a|-4| + 3$

$-5 = 4a + 3$

$-8 = 4a, \quad a = -2$

$y = -2|x-1| + 3$



7) Cube root, LP=(4, 1), passing thru (-4, -7)

$y = a(x-4)^{1/3} + 1$

$-7 = a(-4-4)^{1/3} + 1$

$-7 = a(-8)^{1/3} + 1$

$-7 = a(-2) + 1$

$-8 = a(-2), \quad a = 4$

$y = 4(x-4)^{1/3} + 1$