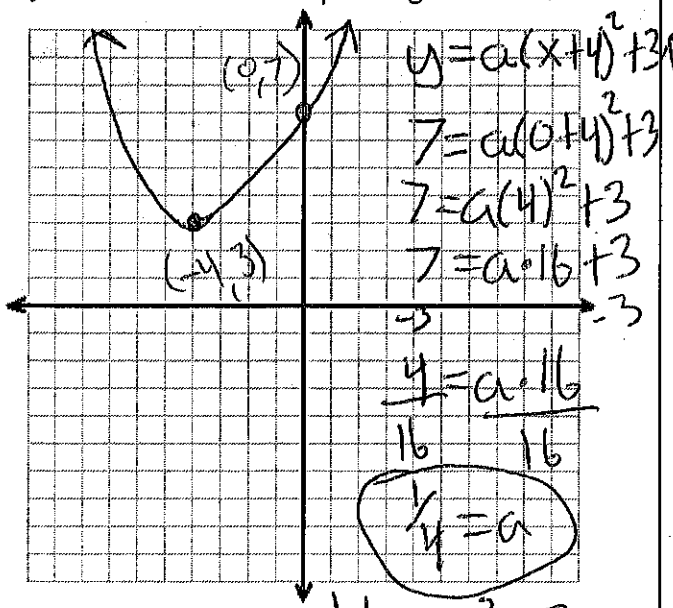
Unit 4: Curve Fitting 1/2/2019

➔ Directions: Sketch the function from the given the parent function, points (locator & pass-thru). Write the equation of the function. Try all the different types of functions.

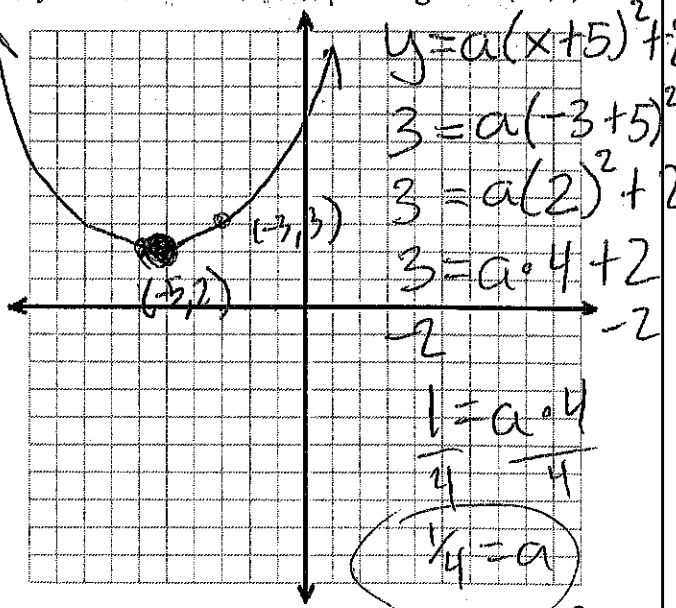
Quadratic:

1) $y = x^2$, vertex (-4,3), passing thru (0,7)



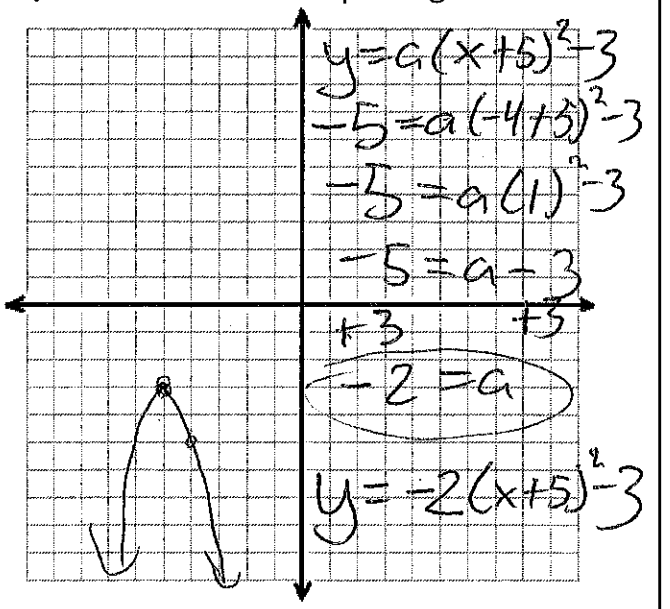
$y=a(x+4)^2+3$
$7=a(0+4)^2+3$
$7=a(4)^2+3$
$7=a\cdot16+3$
$-3 \quad -3$
$\frac{4}{16}=\frac{a\cdot16}{16}$
$\frac{1}{4}=a$
$y=\frac{1}{4}(x+4)^2+3$

2) $y = x^2$, vertex (-5,2), passing thru (-3,3)



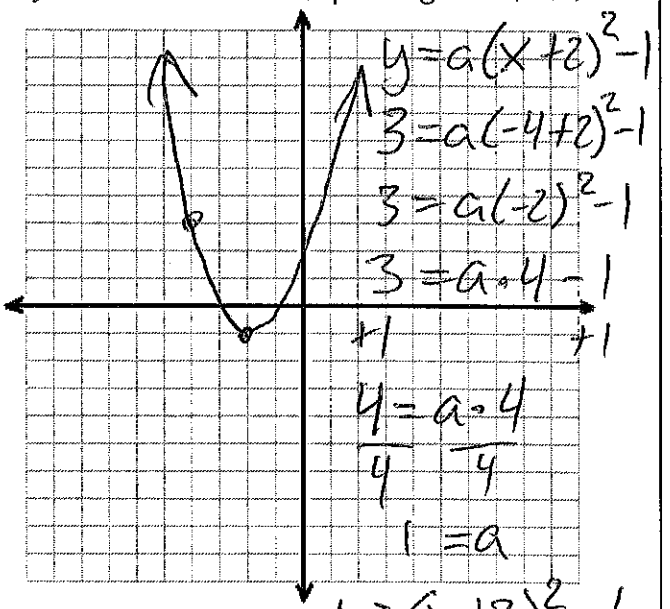
$y=a(x+5)^2+2$
$3=a(-3+5)^2+2$
$3=a(2)^2+2$
$3=a\cdot4+2$
$-2 \quad -2$
$\frac{1}{4}=\frac{a\cdot4}{4}$
$\frac{1}{4}=a$
$y=\frac{1}{4}(x+5)^2+2$

3) $y = x^2$, vertex (-5,-3), passing thru (-4,-5)



$y=a(x+5)^2-3$
$-5=a(-4+5)^2-3$
$-5=a(1)^2-3$
$-5=a-3$
$+3 \quad +3$
$-2=a$
$y=-2(x+5)^2-3$

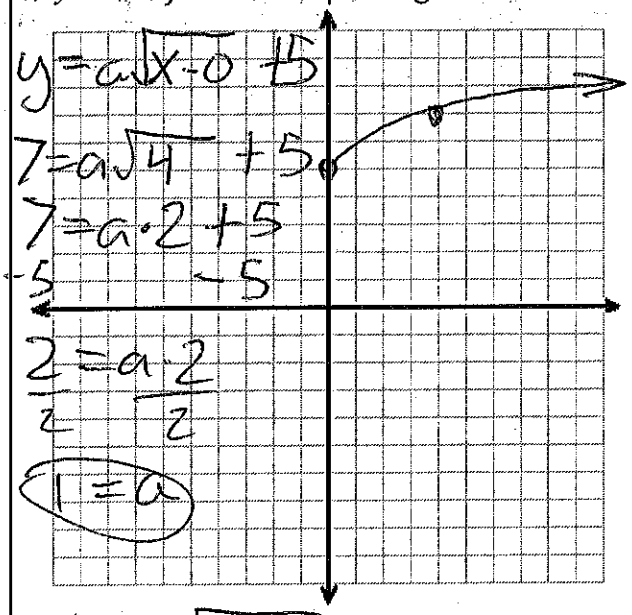
4) $y = x^2$, vertex (-2,-1), passing thru (-4,3)



$y=a(x+2)^2-1$
$3=a(-4+2)^2-1$
$3=a(-2)^2-1$
$3=a\cdot4-1$
$+1 \quad +1$
$\frac{4}{4}=\frac{a\cdot4}{4}$
$1=a$
$y=(x+2)^2-1$

Radical (square & cube roots):

1) $y = \sqrt{x}$, y-int. (0,5), passing thru (4,7)



$y = a\sqrt{x-0} + 5$

$7 = a\sqrt{4} + 5$

$7 = a \cdot 2 + 5$

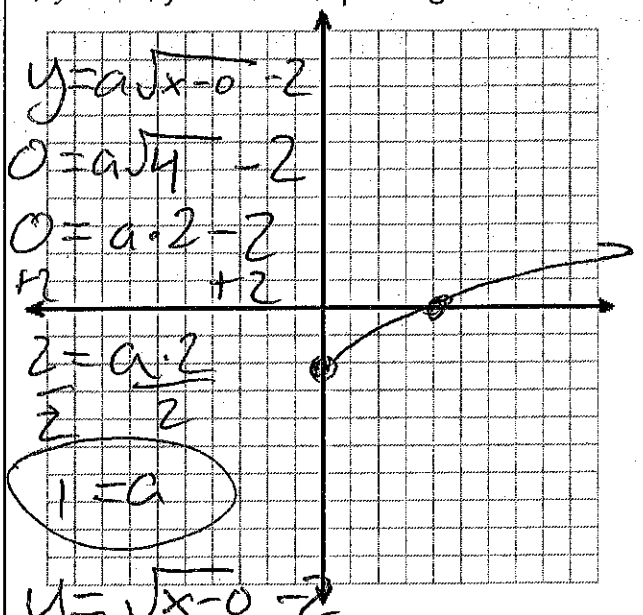
$-5 \quad -5$

$\frac{2}{2} = \frac{a \cdot 2}{2}$

$1 = a$

$y = \sqrt{x-0} + 5$

2) $y = \sqrt{x}$, y-int. (0,-2), passing thru (4,0)



$y = a\sqrt{x-0} - 2$

$0 = a\sqrt{4} - 2$

$0 = a \cdot 2 - 2$

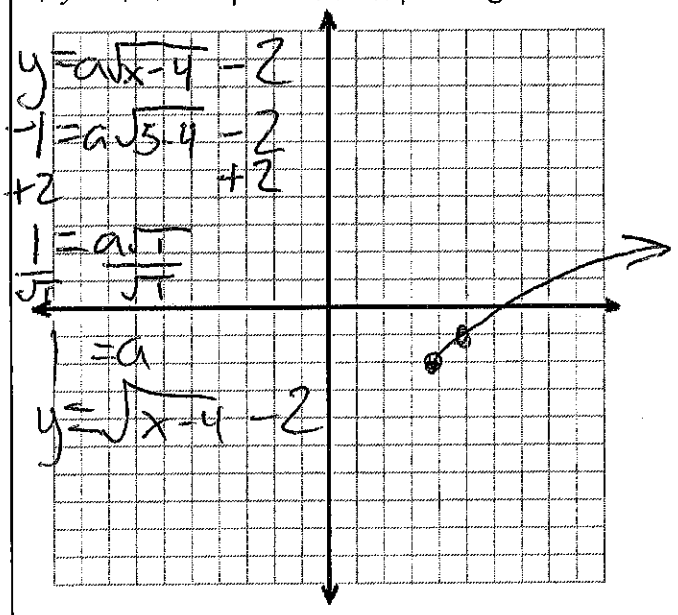
$+2 \quad +2$

$\frac{2}{2} = \frac{a \cdot 2}{2}$

$1 = a$

$y = \sqrt{x-0} - 2$

3) $y = \sqrt{x}$, min point (4,-2), passing thru (5,-1)



$y = a\sqrt{x-4} - 2$

$-1 = a\sqrt{5-4} - 2$

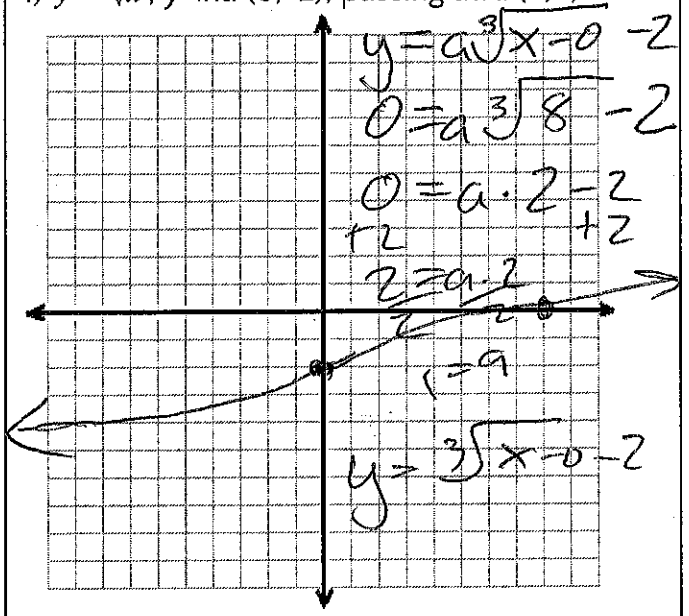
$+2 \quad +2$

$\frac{1}{\sqrt{1}} = \frac{a \cdot 1}{\sqrt{1}}$

$1 = a$

$y = \sqrt{x-4} - 2$

4) $y = \sqrt[3]{x}$, y-int. (0,-2), passing thru (8,0)



$y = a\sqrt[3]{x-0} - 2$

$0 = a\sqrt[3]{8} - 2$

$0 = a \cdot 2 - 2$

$+2 \quad +2$

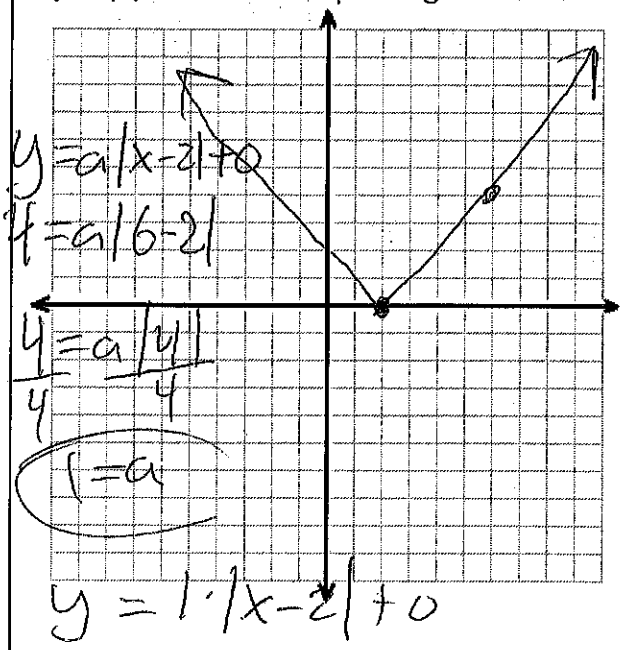
$\frac{2}{2} = \frac{a \cdot 2}{2}$

$1 = a$

$y = \sqrt[3]{x-0} - 2$

Absolute Value

1) $y = |x|$, vertex (2,0), passing thru (6,4)



$y=a|x-2|+0$

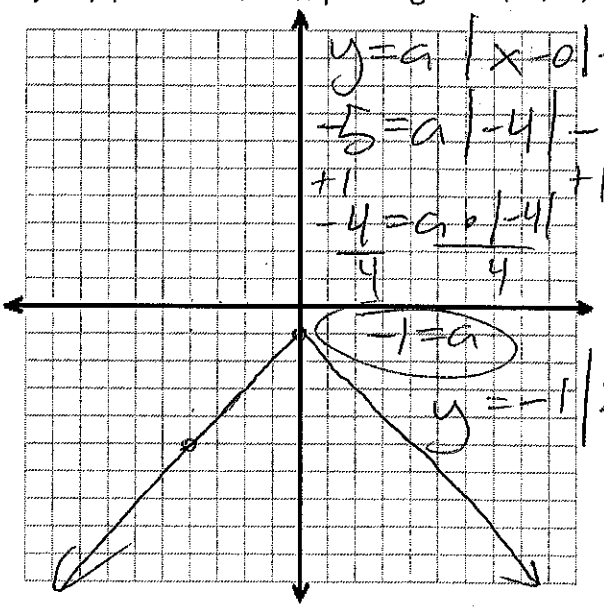
$4=a|6-2|$

$\frac{4}{4}=\frac{a|4|}{4}$

$1=a$

$y=1\cdot|x-2|+0$

2) $y = |x|$, vertex (0,-1), passing thru (-4,-5)



$y=a|x-0|-1$

$-5=a|-4|-1$

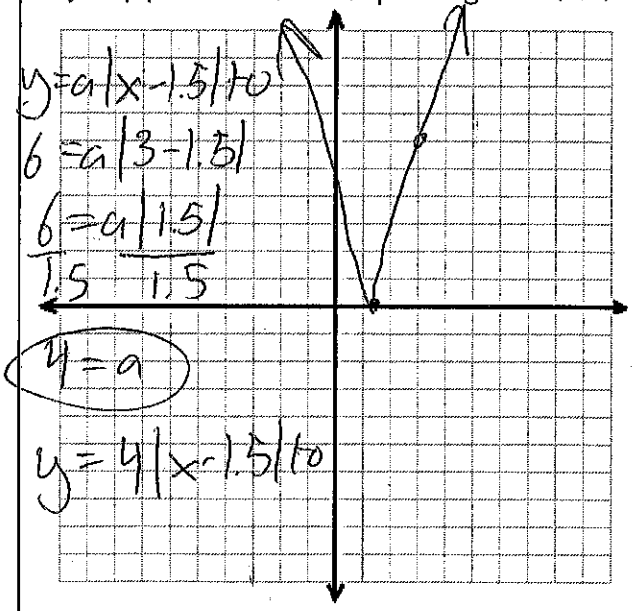
$+1 \quad +1$

$\frac{-4}{4}=\frac{a\cdot|-4|}{4}$

$-1=a$

$y=-1|x-0|-1$

3) $y = |x|$, vertex (1.5, 0), passing thru (3,6)



$y=a|x-1.5|+0$

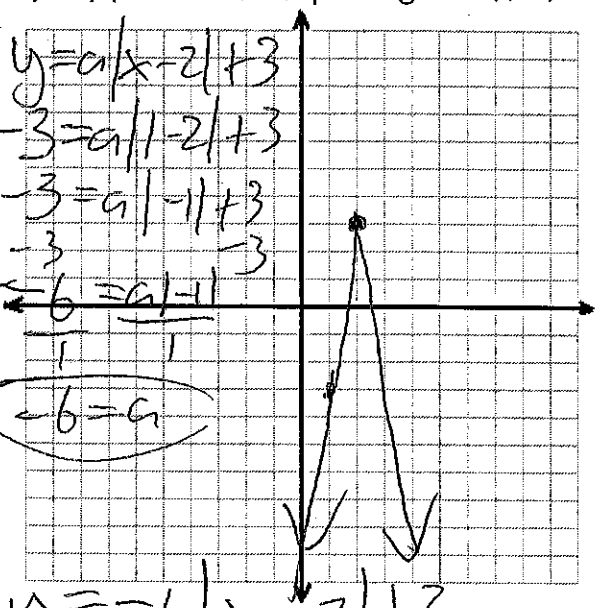
$6=a|3-1.5|$

$\frac{6}{1.5}=\frac{a|1.5|}{1.5}$

$4=a$

$y=4|x-1.5|+0$

4) $y = |x|$, vertex (2,3), passing thru (1,-3)



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

$-3=a|1-2|+3$

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

$-3 \quad -3$

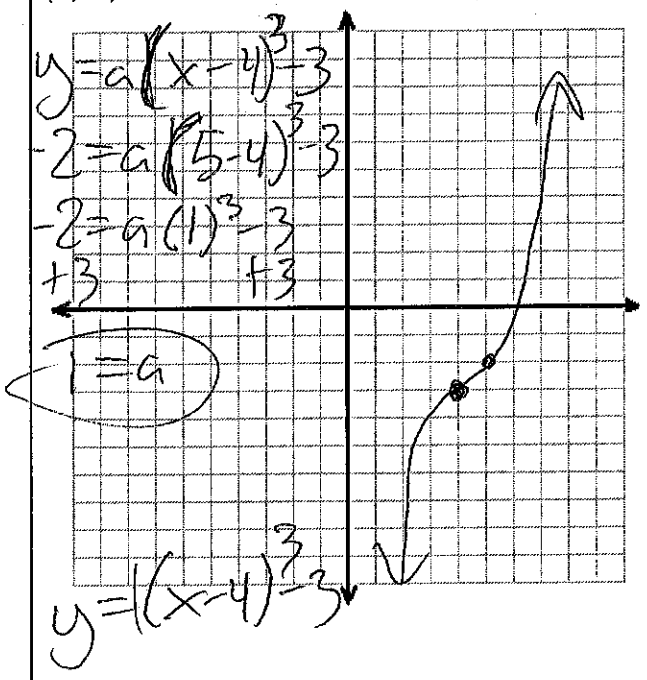
$\frac{-6}{1}=\frac{a|-1|}{1}$

$-6=a$

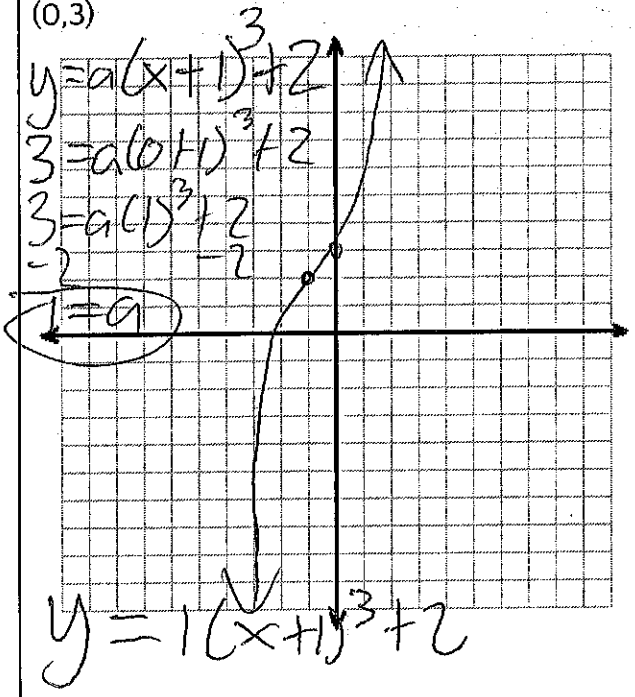
$y=-6|x-2|+3$

Cubic (and two more radicals):

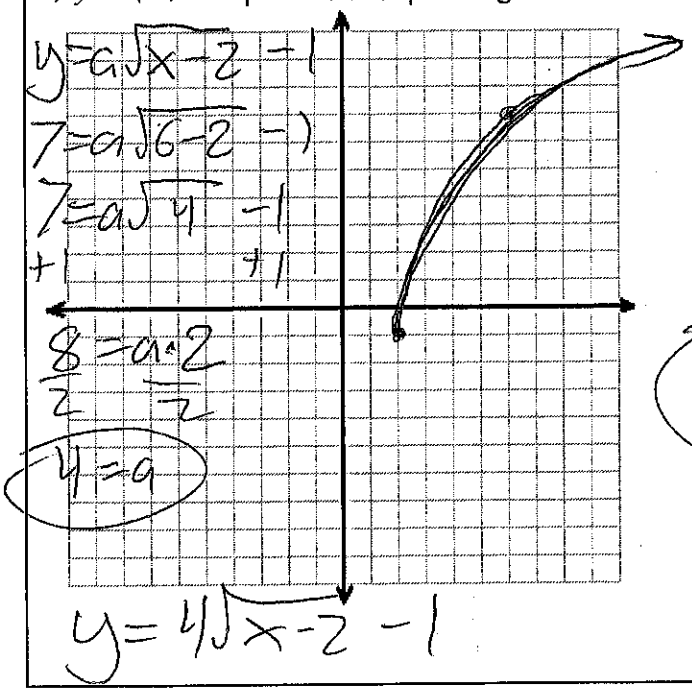
1) $y = x^3$, inflection point (4,-3), passing thru (5,-2)



2) $y = x^3$, inflection point (-1,2), passing thru (0,3)



3) $y = \sqrt{x}$, min point (2,-1), passing thru (6,7)



4) $y = \sqrt{x}$, max point (1,4), passing thru (3,3)