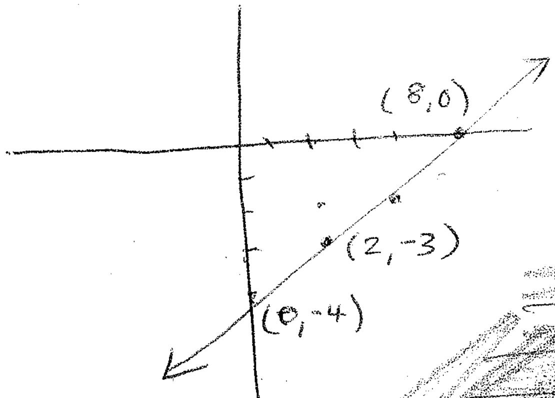
Skill Set #5 Key

#1. A line parallel to another has the same slope. Since we have a pt + the slope, we use $y - y_1 = m(x - x_1)$ to get

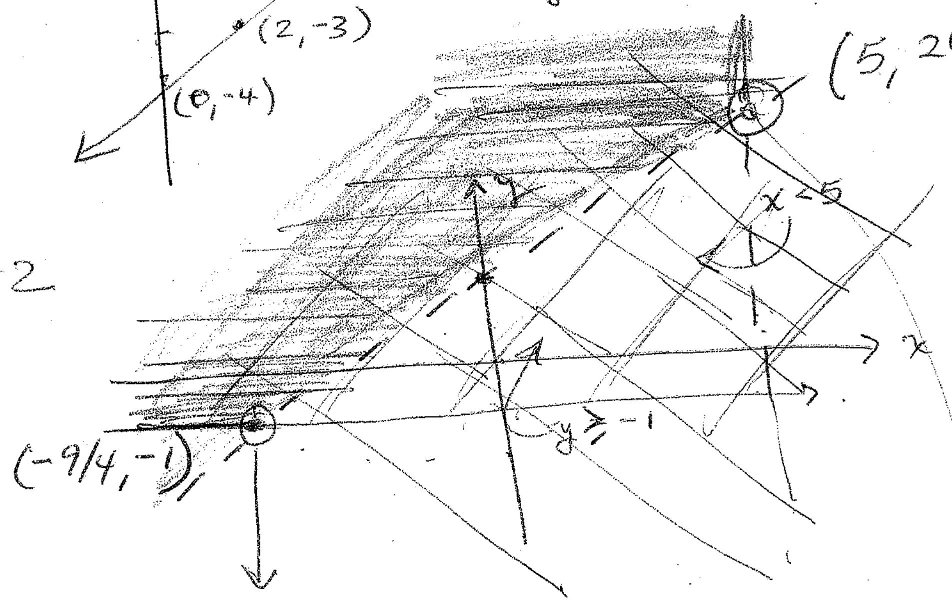
$$y - -3 = \frac{1}{2}(x - 2)$$



$$y + 3 = \frac{1}{2}x - 1$$

$$y = \frac{1}{2}x - 4$$

#2



$$4x - 3y < -6$$

$$3y > 4x + 6$$

$$y > \frac{4}{3}x + 2$$

$y = -1$
intersect $y = \frac{4}{3}x + 2$
at $-1 = \frac{4}{3}x + 2$

$\frac{4}{3} \cdot x = -3$

$\boxed{x = -9/4,\ y = -1}$

$y = \frac{4}{3}x + 2$ intersects $x = 5$ at $y = \frac{4}{3}(5) + 2 = \frac{20}{3} + 2 = \frac{26}{3}$

$\boxed{\left(5, \frac{26}{3}\right)}$

$\boxed{(-9/4, -1)}$ — Not in soln. set, since $y > \frac{4}{3}x + 2$ is a strict inequality. Neither is $(5, 26/3)$ because of the strict inequality of $x < -5$ + $y > \frac{4}{3}x + 2$.

Notice that $(0,0)$ is not in the solution set. — It's always good to check $(0,0)$

$0 \geq -1$ to check $y \geq -1$

$0 < 5$ to check $x < 5$

But $4(0) - 3(0) \not\geq -6$. This is seen to be the case on the graph.

#3. $y = x^2 + 2x - 5$

$y = \underbrace{x^2 + 2x + 1} - 5 - 1$

Solve $(x+1)^2 - 6 = 0$

$(x+1)^2 = 6$

$x + 1 = \pm\sqrt{6}$

$x = -1 \pm \sqrt{6}$

- So roots are $(-1-\sqrt{6}, -1+\sqrt{6})$

Vertex $(-b/2a, f(-b/(2a)))$

Go to original eqn:

Vertex $(-2/2, f(-2/2))$

$= (-1, f(-1))$

- $V = (-1, -6)$
- y-int $f(0) = -5$

$(0, -5)$

$y = x^2 - 2x + 5$

$y = \underbrace{x^2 - 2x + 1} + 5 - 1$

Solve $(x-1)^2 + 4 = 0$

$(x-1)^2 = -4$

$x - 1 = \pm\sqrt{-4}$

- $x = 1 \pm 2i$

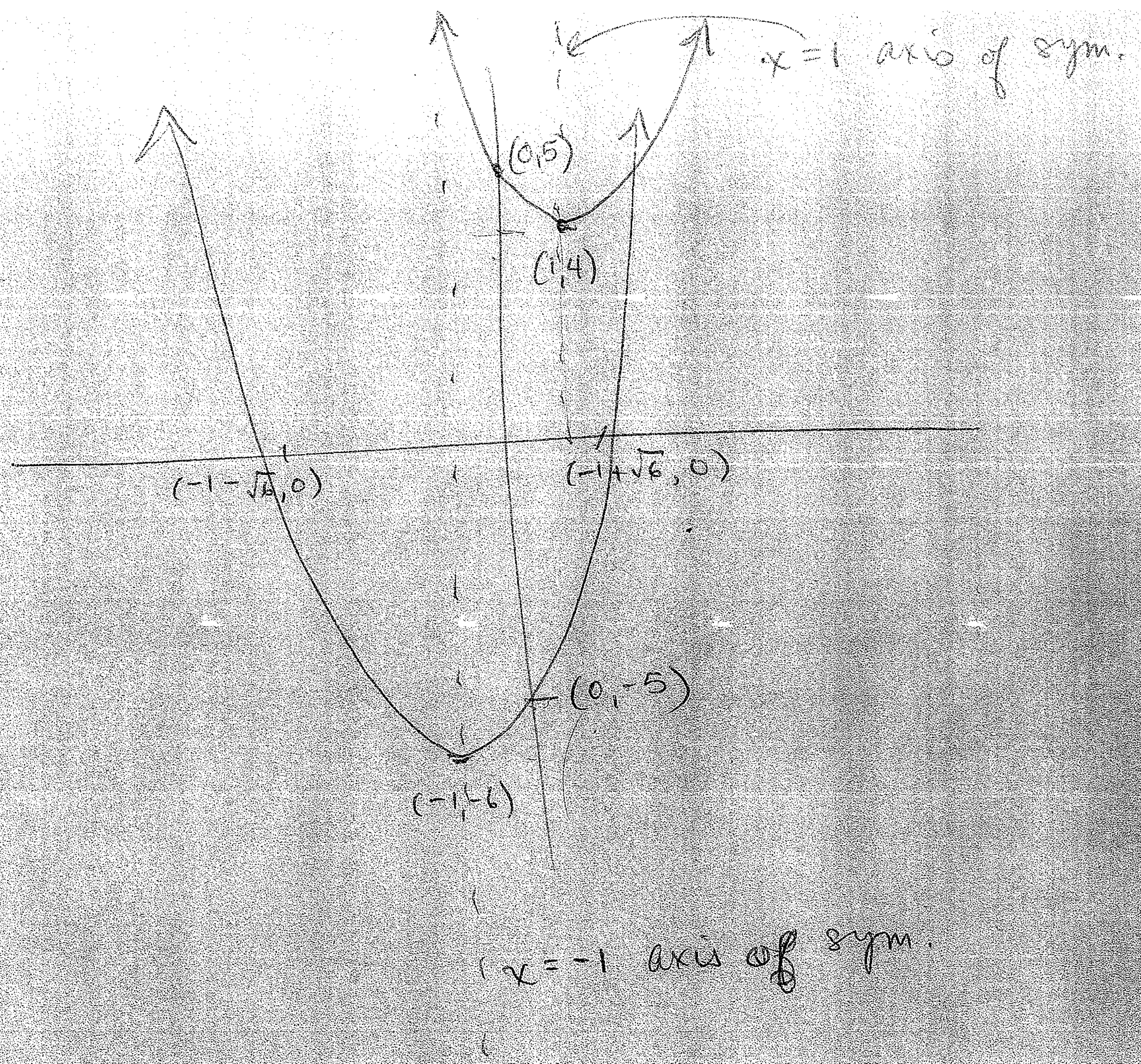
no real roots

Vertex $(2/2, f(2/2))$

$= (1, f(1))$

- $V = (1, 4)$
- y-int $= f(0) = 5$

$(0, 5)$



2

#4. Although many parabolas can have a double root at (0,7) only one goes through (0,10).