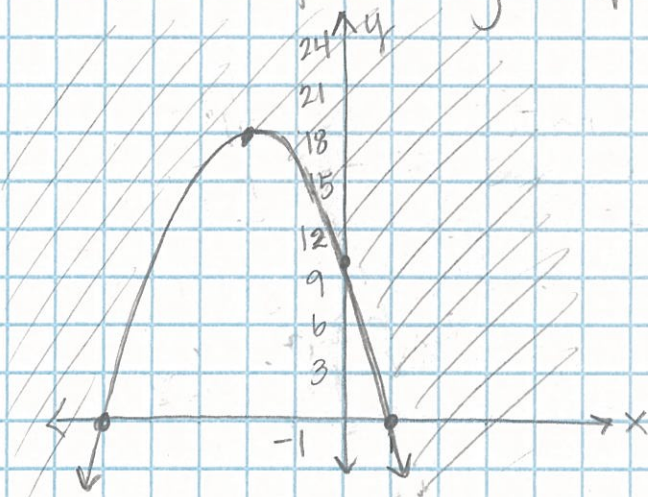


Additional Notes - Section 5.7 Quadratic Inequalities

1) Graph the following inequality: $y \geq -2x^2 - 8x + 10$

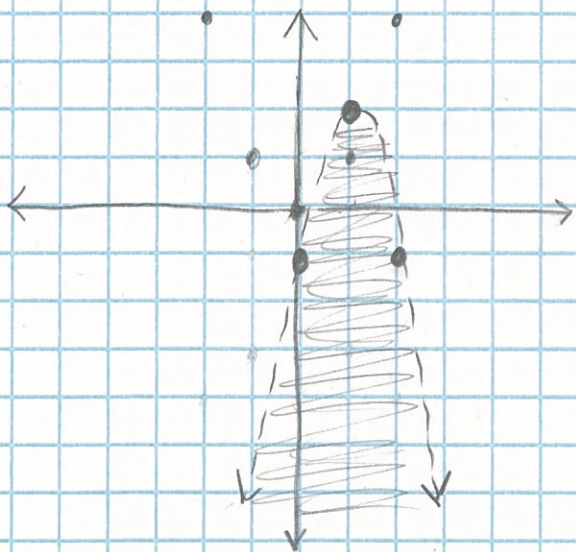


$$\begin{aligned}
 1) \quad 0 &= -2(x^2 + 4x - 5) \\
 0 &= -2(x+5)(x-1) \\
 x &= -5, x = 1
 \end{aligned}$$

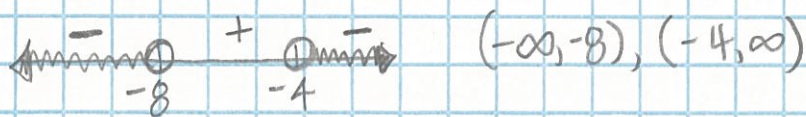
2) $(0, 10)$

3) vertex: $x = \frac{8}{-4} = -2$ $(-2, 18)$
 $y = -2(-2)^2 - 8(-2) + 10$
 $y = -8 + 16 + 10$
 $8 + 10$

2) Graph the following inequality: $y < -3(x-1)^2 + 2$



3) Solve: $-x^2 - 12x < 32$ \swarrow negative
 $-x^2 - 12x - 32 < 0$
 $-(x^2 + 12x + 32) < 0$
 $-(x+4)(x+8) < 0$
 $\downarrow \quad \downarrow$
 $x = -4, x = -8$

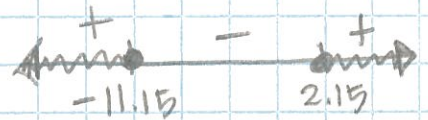


4) solve: $(x-2)(x+11) \geq 2$ ← positive
 $x^2 + 11x - 2x - 22 - 2 \geq 0$
 $x^2 + 9x - 24 \geq 0$

$$x = \frac{-9 \pm \sqrt{(9)^2 - 4(1)(-24)}}{2(1)}$$

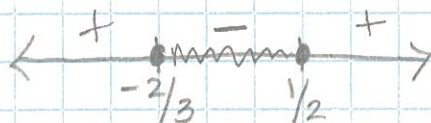
$$x = \frac{-9 \pm \sqrt{81 + 96}}{2}$$

$$x = \frac{-9 \pm \sqrt{177}}{2} \begin{matrix} \nearrow x = 2.15 \\ \searrow x = -11.15 \end{matrix}$$



$$(-\infty, -11.15], [2.15, \infty)$$

5) solve: $9x^2 - 2 \leq -3x$ ← negative
 $9x^2 + 3x - 2 \leq 0$
 $(3x+2)(3x-1) \leq 0$
 $\downarrow \quad \downarrow$
 $x = -2/3 \quad x = 1/2$



$$[-2/3, 1/2]$$