9. Solve each inequality below.

a. $x^2 + 3x - 6 \le x + 2$

$-x \quad -2 \quad -x-2$

$x^2+2x-8 \le 0$

$x = -\frac{b}{2a} = \frac{-2}{2(1)} = -1$

$(-1)^2+2(-1)-8$

$1-2-8 = -9 \quad V(-1,-9)$

y-intercept $(0,-8)$

x-intercepts

$x^2+2x-8=0$

$(x+4)(x-2)=0$

$x+4=0 \quad x-2=0$

$x=-4 \quad x=2$

-8

$-8 \cdot 1$

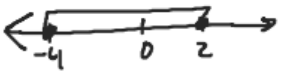
$-1 \cdot 8$

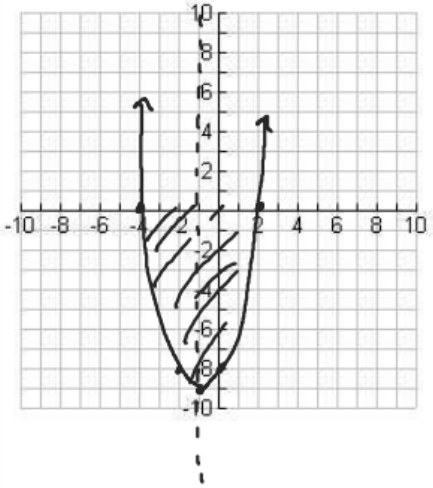
$-4 \cdot 2$

$-2 \cdot 4$

$-4 \le x \le 2$

$[-4, 2]$





b. $7 - x < \frac{10}{x}$

$x(7-x) < \left(\frac{10}{x}\right)x$

$7x - x^2 < 10$

$-x^2+7x-10 < 0$

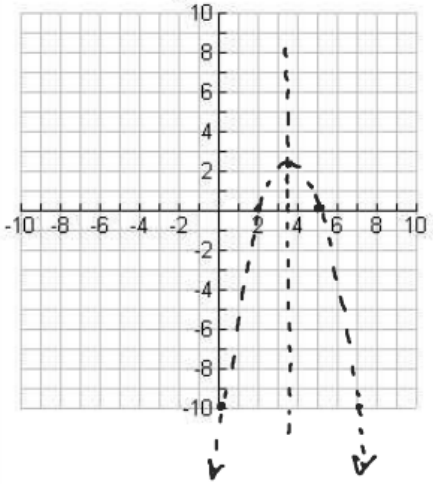
$-x^2+7x-10=0$

$x^2-7x+10=0$

$(x-5)(x-2)=0$

$x-5=0 \quad x-2=0$

$x=5 \quad x=2$



$x = -\frac{b}{2a} = \frac{-7}{2(-1)} = \frac{7}{2}$

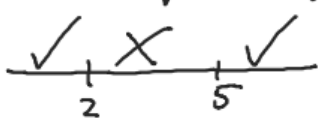
$-\left(\frac{7}{2}\right)^2+7\left(\frac{7}{2}\right)-10$

$-\frac{49}{4}+\frac{49}{2}-10$

$-\frac{49}{4}+\frac{98}{4}-\frac{40}{4} = \frac{9}{4}$

$V\left(\frac{7}{2}, \frac{9}{4}\right) = (3.5, 2.25)$

y-intercept $(0,-10)$



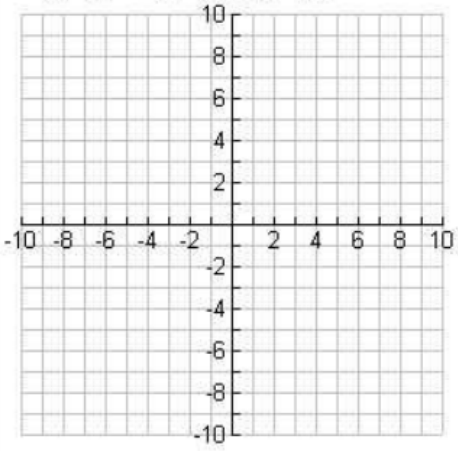
$x < 2$ or $x > 5$

$-(3)^2+7(3)-10 \quad -(6)^2+7(6)-10$

$-9+21-10 \quad -36+42-10$

$(-\infty, 2) \cup (5, \infty)$

c. $x^2 - 4x - 5 \geq 2x + 2$



V(3,-16)

y-inter (0,-7)

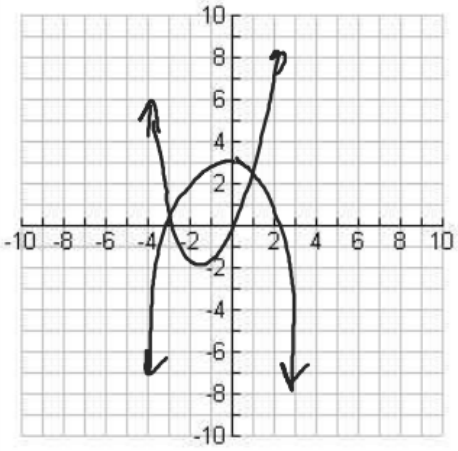
x = -1, 7

$x \leq -1$ or $x \geq 7$

$(-\infty, -1] \cup [7, \infty)$

10. Graph the system of inequalities

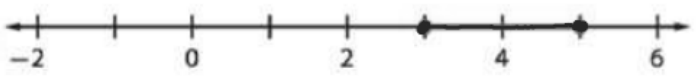
$y \leq -x^2 + 3$
$y \geq x^2 + 2x - 4$



11. Here are some descriptions of solutions for several inequalities. Describe each solution using interval notation.

a. $x < -2$ or $x > 0$ $(-\infty,-2) \cup (0,\infty)$

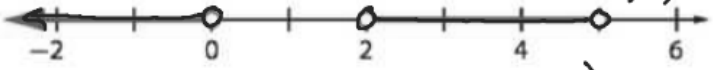
b.



$[3,5]$

c. $0 \leq x < 1$ $[0,1)$

d.

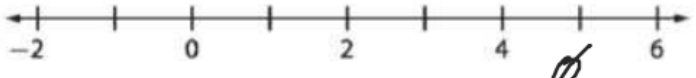


$(-\infty,0) \cup (2,5)$

e. $x \leq -1$ or $x \geq 7$ $(-\infty,-1] \cup [7,\infty)$

f. The inequality is true for all values of x. $(-\infty,\infty)$

g.



$\emptyset$