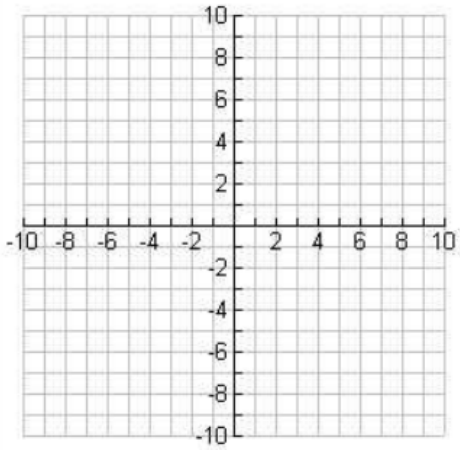
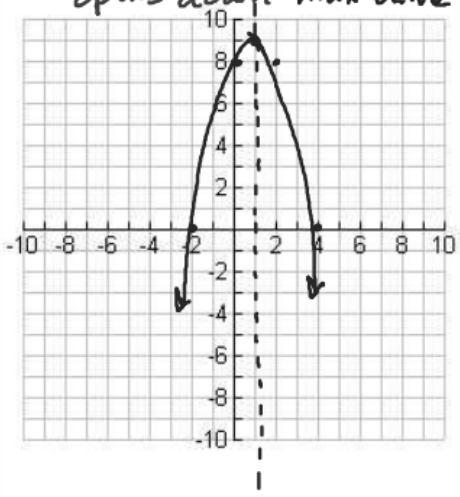
b. $g(x) = x^2 + 6x + 9$



$a = -1 \quad b = 2 \quad c = 8$

c. $h(x) = -x^2 + 2x + 8$

opens down max value



Y-intercept

(0,8)

A.O.S. $x = 1$

Vertex

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

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

$= -1 + 2 + 8$

$= 9$ (1,9)

x-intercepts (Factor)

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

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

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

$x = 4 \quad x = -2$

A.O.S.

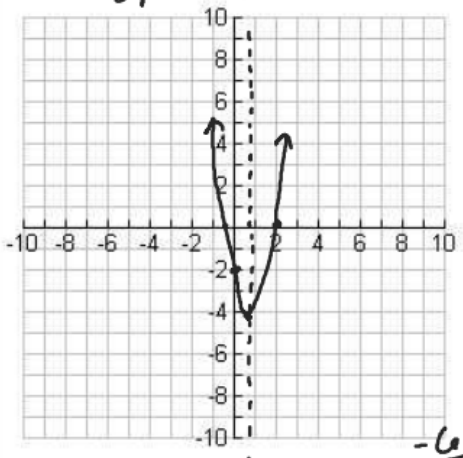
$x = 5/6$

$x = -\frac{1}{3}$

$x = 2$

d. $f(x) = 3x^2 - 5x - 2$

opens up min



$x = \frac{-b}{2a} = \frac{5}{2(3)} = \frac{5}{6}$

$3\left(\frac{5}{6}\right)^2 - 5\left(\frac{5}{6}\right) - 2$

$\frac{3}{1}\left(\frac{25}{36}\right) - \frac{5}{1}\left(\frac{5}{6}\right) - 2$

$\frac{75}{36} - \frac{25}{6} - 2$

$\frac{75}{36} - \frac{150}{36} - \frac{72}{36}$

$-\frac{147}{36}$

$\left(\frac{5}{6}, -\frac{49}{12}\right)$

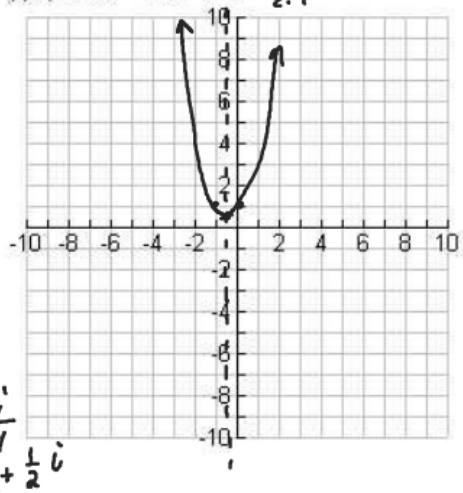
$3x^2 - 5x - 2 = 0$ $\quad -6 \cdot 1$

$(3x^2 - 6x) + (x - 2) = 0$

$3x(x-2) + 1(x-2)$

$(3x+1)(x-2) = 0$

e. $j(x) = 2x^2 + 2x + 1$ $\quad 2 \cdot 1 \quad -2 \cdot -1$



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

$2\left(-\frac{1}{2}\right)^2 + 2\left(-\frac{1}{2}\right) + 1$

$\frac{2}{1}\left(\frac{1}{4}\right) + \frac{2}{1}\left(-\frac{1}{2}\right) + 1$

$\frac{1}{2} - 1 + 1$

$\frac{1}{2}$

$\left(-\frac{1}{2}, \frac{1}{2}\right)$

Quadratic Formula

$\frac{-b}{2a} \pm \frac{\sqrt{b^2 - 4ac}}{2a}$

$\frac{-2}{2(2)} \pm \frac{\sqrt{(2)^2 - 4(2)(1)}}{2(2)}$

$-\frac{1}{2} \pm \frac{\sqrt{4-8}}{4}$

$-\frac{1}{2} \pm \frac{\sqrt{-4}}{4} = -\frac{1}{2} \pm \frac{2i}{4}$

$-\frac{1}{2} + \frac{1}{2}i$

No Real solution

$i = \sqrt{-1}$

$\sqrt{-4} = \sqrt{4} \cdot \sqrt{-1}$

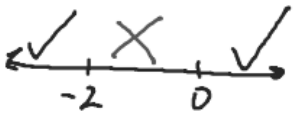
$2i$

Graphing Quadratic Inequalities

1. **Graph the Curve**
2. **Dotted/Solid**

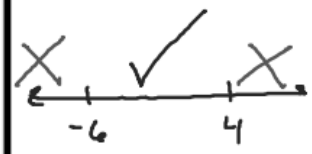
$<$ $>$ dotted ↙↘ $\leq$ $\geq$ solid

3. **Shade**



$(-3)^2+2(-3)$

$9-6$



$(-7)^2+2(-7)-24$

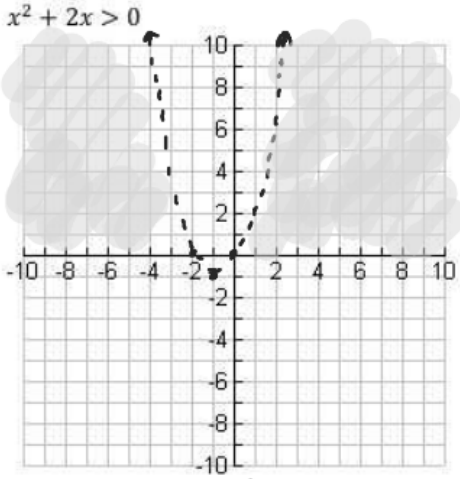
$49-14-24$

$(5)^2+2(5)-24$

$25+10-24$

6. For each inequality:
   - Graph each inequality
   - Record the solution using symbols, interval notation, and a number line graph.

a. $x^2+2x>0$



Vertex

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

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

$1-2=-1$

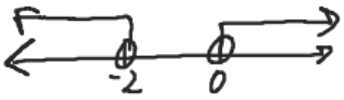
$x^2+2x=0$

$x(x+2)=0$

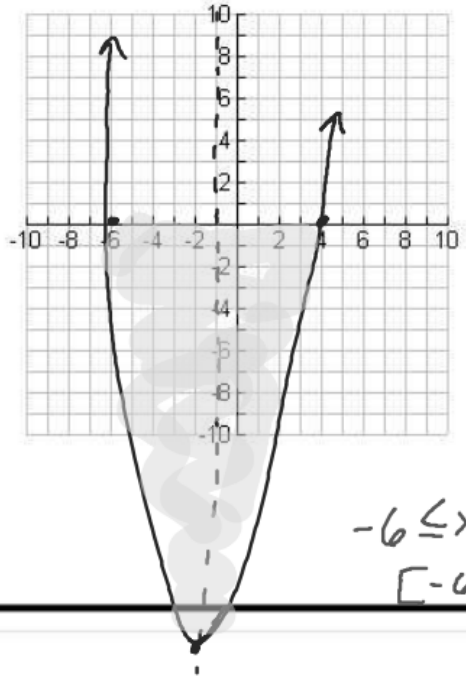
$x=0$ $x=-2$

$x<-2$ or $x>0$

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



b. $n^2+2n-24\leq 0$



$-\frac{2}{2(1)}=-1$

$(-1)^2+2(-1)-24$

$1-2-24$

-25

$n^2+2n-24=0$

$(n+6)(n-4)=0$

$n=-6$ $n=4$

$-6\leq x\leq 4$

$[-6,4]$