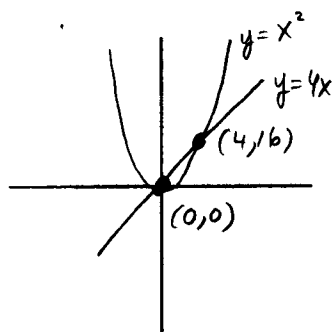


P-27 Find the intersection point(s) (if any) of each line and parabola. Make a sketch for each problem.

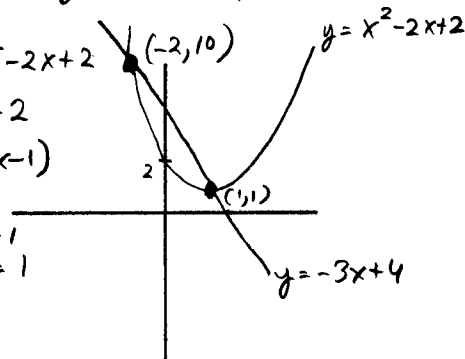
1. $y = 4x$ and $y = x^2$

$$\begin{aligned} 4x &= x^2 \\ 0 &= x^2 - 4x \\ 0 &= x(x-4) \\ \text{so } x &= 0 \text{ or } x = 4 \\ y &= 0 \quad y = 16 \end{aligned}$$



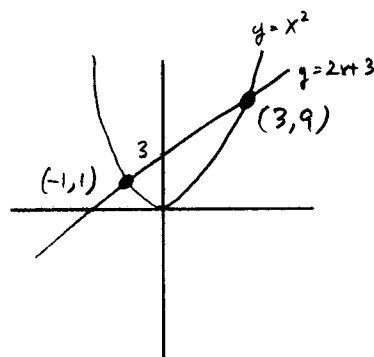
4. $y = -3x + 4$ and $y = x^2 - 2x + 2$

$$\begin{aligned} -3x + 4 &= x^2 - 2x + 2 \\ 0 &= x^2 + x - 2 \\ 0 &= (x+2)(x-1) \\ \text{so } x &= -2 \text{ or } x = 1 \\ y &= 10 \quad y = 1 \end{aligned}$$



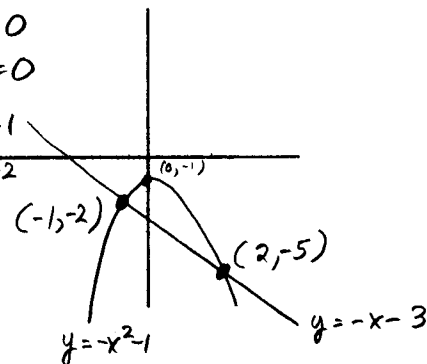
2. $y = 2x + 3$ and $y = x^2$

$$\begin{aligned} 2x + 3 &= x^2 \\ 0 &= x^2 - 2x - 3 \\ 0 &= (x-3)(x+1) \\ \text{so } x &= 3 \text{ or } x = -1 \\ y &= 9 \quad y = 1 \end{aligned}$$



5. $y = -x - 3$ and $y = -x^2 - 1$

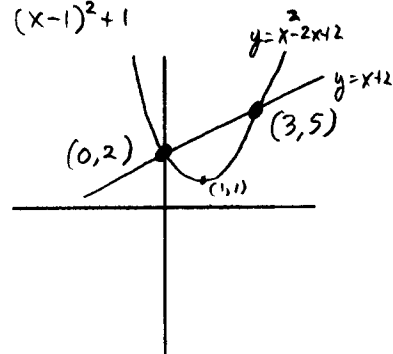
$$\begin{aligned} -x - 3 &= -x^2 - 1 \\ x^2 - x - 2 &= 0 \\ (x-2)(x+1) &= 0 \\ \text{so } x &= 2 \text{ or } x = -1 \\ y &= -5 \quad y = -2 \end{aligned}$$



3. $y = x + 2$ and $y = x^2 - 2x + 2$
 $= (x-1)^2 + 1$

$$\begin{aligned} x + 2 &= x^2 - 2x + 2 \\ 0 &= x^2 - 3x \\ 0 &= x(x-3) \end{aligned}$$

$$\begin{aligned} \text{so } x &= 0 \text{ or } x = 3 \\ y &= 2 \quad y = 5 \end{aligned}$$



6. $y = 2x$ and $y = -x^2 - 1$

$$\begin{aligned} 2x &= -x^2 - 1 \\ x^2 + 2x + 1 &= 0 \\ (x+1)^2 &= 0 \\ x &= -1 \\ y &= -2 \end{aligned}$$

