

Use substitution to find where the linear and quadratic equations intersect.

$$1. \quad y = x^2 + 4x - 5$$

$$3x - y = -1 \Rightarrow y = 3x + 1$$

$$3x + 1 = x^2 + 4x - 5$$

$$0 = x^2 + x - 6$$

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

$$\boxed{x = -3 \quad x = 2}$$

$$y = 3(-3) + 1 = -8$$

$$y = 3(2) + 1 = 7$$

$$\boxed{\begin{matrix} (-3, -8) \\ (2, 7) \end{matrix}}$$

$$3. \quad y = x^2 - 2x - 6$$

$$y = -7$$

$$-7 = x^2 - 2x - 6$$

$$0 = x^2 - 2x + 1$$

$$0 = (x-1)(x-1)$$

$$x = 1$$

$$\boxed{y = (-1, -7)}$$

$$2. \quad y = 2x^2 + 4x$$

$$2x - 2y = 8$$

$$2x - 2(2x^2 + 4x) = 8$$

$$2x - 4x^2 - 8x = 8$$

$$-4x^2 - 6x - 8 = 0$$

$$-2(2x^2 + 3x + 4) = 0$$

$$\frac{? \cdot 8}{3} ?$$

$$x = \frac{6 \pm \sqrt{(-6)^2 - 4(-4)(-8)}}{2(-4)}$$

$$x = \frac{6 \pm \sqrt{-92}}{-8} = \emptyset$$

$$4. \begin{aligned} y &= -x^2 + 2x + 5 \\ -x + y &= -1 \Rightarrow y = x - 1 \end{aligned}$$

$$x - 1 = -x^2 + 2x + 5$$

$$x^2 - x - 6 = 0$$

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

$$x = 3 \quad x = -2$$

$$y = 3 - 1 = 2$$

$$y = -2 - 1 = -3$$

$$\boxed{\begin{matrix} (3, 2) \\ (-2, -3) \end{matrix}}$$

$$5. \begin{aligned} y &= x^2 - 2x + 2 \\ -6x + 3y &= -6 \end{aligned}$$

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

$$-6x + 3x^2 - 6x + 6 = -6$$

$$3x^2 - 12x + 12 = 0$$

$$3(x^2 - 4x + 4) = 0$$

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

$$x = 2$$

$$y = 2^2 - 2(2) + 2 = 2$$

$$\boxed{(2, 2)}$$

$$6. \begin{aligned} y &= x^2 + 6x - 1 \\ y &= -x^2 - 6x - 1 \end{aligned}$$

$$x^2 + 6x - 1 = -x^2 - 6x - 1$$

$$2x^2 + 12x = 0$$

$$2x(x + 6) = 0$$

$$x = 0 \quad x = -6$$

$$y = 0^2 + 6(0) - 1 = -1$$

$$y = (-6)^2 + 6(-6) - 1 = -1$$

$$\boxed{\begin{matrix} (0, -1) \\ (-6, -1) \end{matrix}}$$