4.1 Systems of Equations Practice Problems

1. Solve each of the systems of equations below by the method of your choice. If there are infinitely many solutions, find 3 solutions. If there are more than one solution and not infinitely many, find all of them.

(a) \[ \begin{align*}
    x - y &= 2 \\
    2x + 3y &= 9
\end{align*} \]

(b) \[ \begin{align*}
    2x + y &= -1 \\
    x - 2y &= -8
\end{align*} \]

(c) \[ \begin{align*}
    x - 5y &= 10 \\
    y^2 + 3y &= x - 2
\end{align*} \]

(d) \[ \begin{align*}
    6x + 4y &= 10 \\
    9x + 6y &= 15
\end{align*} \]

(e) \[ \begin{align*}
    5x + y &= -1 \\
    x - 5y &= -4
\end{align*} \]

(f) \[ \begin{align*}
    6x + 4y &= 10 \\
    3x + 2y &= -2
\end{align*} \]

(g) \[ \begin{align*}
    y &= 7 \\
    3x - 2y &= 11
\end{align*} \]

2. Suppose you have a system of equations where the graph of one equation is a circle and the graph of the other equation is a line. How many solutions are possible?

3. Suppose you have a system of equations where one equation is \( y = |x| \) and the other equation is a line. How many solutions are possible?

4. Find the intersection points of the graphs of \( x = 1 \) and \( y = 5 \).

5. Find the intersection points of the graphs of \( y = x^2 \) and \( y - 2x = 1 \).