\[
\begin{align*}
\begin{cases}
3x - 2y &= 0 
\rightarrow 3x = 2y 
\Rightarrow x = \frac{2}{3}y \\
x^2 - y^2 &= 4
\end{cases}
\end{align*}
\]

\[
\left(\frac{2}{3}y\right)^2 - y^2 = 4
\]

\[
\frac{4}{9}y^2 - y^2 = 4
\]

\[
-\frac{5}{9}y^2 = 4
\]

\[
y^2 = -\frac{36}{5}
\]

No Real Solution
7.2 Two-Variable Linear System

1 solution
consistent (solution)
independent

Many solutions
consistent
dependent

No solution
inconsistent
Elimination

1) Write equations in columns
2) Obtain coefficients of a variable that differ only in sign by multiplying the eqs. by constants.
3) Add the eqs and solve
4) Back-substitute into either original eq. and solve
5) Check your answer

If all variables are eliminated and the result is true \((0 = 0)\), many sol.
False \((0 = 9)\), no sol.
Solve

\[ \begin{cases} 4x + y = -3 \\ x - 3y = 9 \end{cases} \]

\[ \begin{align*}
3(4x + y &= -3) \\
12x + 3y &= -9 \\
&\quad \frac{13x}{13} = 0 \\
x &= 0
\end{align*} \]

\[ \begin{align*}
4(0) + y &= -3 \\
y &= -3
\end{align*} \]

\( (0, -3) \)