\[
\frac{dy}{dx} = x - y \\
\frac{dy}{dx} = \frac{x}{y} \\
\frac{dy}{dx} = y - x \\
\frac{dy}{dx} = -\frac{x}{y} \\
\frac{dy}{dx} = x \\
\frac{dy}{dx} = -\frac{y}{x} \\
\frac{dy}{dx} = \frac{y}{2} \\
\frac{dy}{dx} = 0.25y(4 - y) \\
\frac{dy}{dx} = 2 - y \\
\frac{dy}{dx} = x + y
\]
Substituting into the differential equation verifies that \( y = \sqrt{4 - x^2} \) is a solution.

The solution curve that passes through the point \((0, -1)\) is the line \( y = x - 1 \).

The solution curves are hyperbolas, and there are no equilibrium solutions.

The solution curve that passes through the point \((-1, 0)\) is the line \( y = -x - 1 \).

The solution curve that passes through the point \((0, -1)\) is the line \( y = x - 1 \).

The solution curve that passes through the point \((1, 1)\) has a local maximum at \((1, 1)\).

There is exactly one equilibrium solution and it is unstable.

The solution curves are logistic and have two horizontal asymptotes.

The equation and the slope field both show that this is an autonomous differential equation. \( \lim_{x \to \infty} y = 2 \).

The solution curves have a vertical asymptote at \( x = 0 \).

The solution curves are parabolas.