Sketch the phase line for the following equation:

\[ \frac{dy}{dt} = y^2 - 6y - 7. \]

Identify the equilibrium points as sinks, sources, or nodes.

**SOLUTION:** Solving the equation

\[ y^2 - 6y - 7 = (y + 1)(y - 7) = 0, \]

gives us the equilibrium points \( y = -1 \) and \( y = 7 \).

Since \( \frac{dy}{dt} < 0 \) for \( -1 < y < 7 \) and \( \frac{dy}{dt} > 0 \) for \( y < -1 \) and \( y > 7 \), 7 is a source and -1 is a sink. The phase line looks like this:

```
  7
 /|
/ |
/  |
-1
```