\[ y = 1 - xy \]

\[ (x, y) \]

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>3.0</td>
<td>0.0</td>
</tr>
<tr>
<td>1.0</td>
<td>1</td>
</tr>
<tr>
<td>-1.1</td>
<td>-1</td>
</tr>
</tbody>
</table>
\[ y' = x^2 \]

A solution is \( y = \frac{1}{3} x^3 \)

So is \( y = \frac{1}{3} x^3 + 15 \)

Initial value \( y(0) = 0 \)
Let's look for an approximation to the solution to \( y' = 1 - xy \) for \( y(0) = 0 \) with step size 0.2.

First estimate \( y(1) \) have to go 5 steps of 0.2 to get from \( y(0) \) (which we know) to \( y(1) \) which we want.
\[ y(0) = 0 \quad (x_0, y_0) = (0, 0) \]

at \((0,0)\) slope is \(y' = 1 - 0.0 = 1\)

so tangent line is

\[ y - 0 = y' (x - 0) \]

so \(y = 1 \cdot x\), plug in \(x_1 = 0.2\)

\[ y_1 = 1 \cdot 0.2 = 0.2 \]

to get \((0.2, 0.2)\)
do it again

at (1.2, 2). The slope is

\[ y' = 1 - 0.2 \times 2 = 1 - 0.4 = 0.96 \]

tangent line is

\[ y - 2 = 0.96 (x - 1.2) \]

\[ y - 2 = 0.96 (y' - 2) \]

etc.
general form

\[ y_n = y'(x_{n-1}, y_{n-1}) \cdot \text{step} + y_{n-1} \]

step is given

\[ x_i = x_0 + i \cdot \text{step} \]