13. \[ y = \ln x + \sqrt{\ln x} \]

**Step 1:**

\[ y = \ln x + (\ln x)^{\frac{1}{2}} \quad \text{Algebra Simplify} \]

**Step 2:**

\[ y' = \frac{1}{x} + \frac{1}{2}(\ln x)^{-\frac{1}{2}} \cdot \frac{1}{x} \]

**Step 3:** Algebra clean up!

\[
\frac{1}{x} - \frac{1}{2\sqrt{\ln x}} \quad \text{or} \quad \frac{1}{x}\left(2 + \frac{1}{\sqrt{\ln x}} \right)
\]

get 2 out of bottom

Then,

\[
\frac{1}{x}\left(\frac{2}{2} + \frac{1}{2\sqrt{\ln x}}\right)
\]

\[
= \frac{1}{2x} \left(2 + \frac{1}{\sqrt{\ln x}}\right)
\]

\[
\frac{1}{x} + \frac{1}{2x\sqrt{\ln x}} \quad \text{or}
\]
#14. \( xy + x = 9 \)  

Because not \((y =)\) means this is implicit.

**Step 1.** Look at parts

- 1st piece + 2nd piece = 3rd piece
  
  \( \begin{align*}
  \text{Product rule} \\
  f &= x \\
  g &= y
  \end{align*} \)

- 1st piece + 2nd piece = 3rd piece
  
  \( \begin{align*}
  f' &= 1 \\
  g' &= y^2
  \end{align*} \)

- \( f'g + g'f = 1 \cdot y + x \cdot y^2 \)

- \( = y + xy^2 + 1 = 9 \)

**Step 2.** Circle \( y^2 \)

- \( y + xy^2 + 1 = 9 \)

**Step 3.** Get \( y^2 \) by itself

- \( xy^2 = -y - 1 \)

**Step 4.** Recombine pieces

- \( \frac{xy^2}{x} = \frac{-y - 1}{x} \)

**Step 5.** Can manipulate

- \( y + 1 \)

**Step 6.** Final answer

- \( y' = \frac{-y - 1}{x} \)
\[(y+1)^4 = (x-1)^3\]

**Step 1:** Not \((y=)\) so we know it's implicit.

**Step 2:** Both are power pieces.

1st piece:
\[(y+1)^4 = (x-1)^3\]

2nd piece:
\[4(y+1)^3 = 3(x-1)^2\]

**Step 4:** Inside derivative \((y+1)\) = \(y^3\)

\[(x-1) = 1\] (Inside derivative)

**Step 5:**
\[4(y+1)^3 \cdot y^3 = 3(x-1)^2\]

**Step 6:** Combine pieces
\[\frac{y^3}{4(y+1)^3} = \frac{3(x-1)^2}{4(y+1)^3}\]

\[y' = \frac{3(x-1)^2}{4(y+1)^3}\]