

Review #2 #13, #14, #15

(13) $y = \ln x + \sqrt{\ln x}$

Step 1 $y = \ln x + (\ln x)^{1/2}$ Algebra Simplify

Step 2 $y' = \frac{1}{x} + \frac{1}{2}(\ln x)^{-1/2} \cdot \frac{1}{x}$

Step 3 Algebra clean up!

$$= \frac{1}{x} \left(1 + \frac{1}{2\sqrt{\ln x}} \right)$$
 or

get 2 out of bottom

Then, $\frac{1}{x} \left(\frac{2}{2} + \frac{1}{2\sqrt{\ln x}} \right)$

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

$$\frac{1}{x} + \frac{1}{2x\sqrt{\ln x}}$$
 or

#14 $xy + x = 9$ B/c not $(y=)$ means this is implicit.

Step 1 Look @ parts

$$\begin{array}{l} \text{1st piece} \quad + \quad \text{2nd piece} \quad = \quad \text{3rd piece} \\ (xy) \quad \quad \quad x \quad \quad \quad 9 \\ \text{Product rule} \quad \quad \quad) = 1 \quad \quad \quad) = \emptyset \end{array}$$

Step 2

$$\begin{array}{l} f = x \quad g = y \\ f' = 1 \quad g' = y' \end{array}$$

Step 3

$$\begin{aligned} & f'g + g'f \\ & = 1 \cdot y + x \cdot y' \\ & = \underbrace{y}_{\text{1st piece}} + \underbrace{xy'}_{\text{2nd piece}} + \underbrace{1}_{\text{3rd piece}} = \emptyset \end{aligned}$$

Step 4 Recombine pieces

Step 5 Circle y'

$$y + x(y') + 1 = \emptyset$$

Step 6 Get y' by itself

$$\frac{xy'}{x} = \frac{-y-1}{x}$$

Step 7

$$y' = \frac{-y-1}{x}$$

Final answer

can manipulate $\frac{y+1}{-x}$

$$(15) (y+1)^4 = (x-1)^3$$

Step 1 Not ($y =$) so we know it's implicit

Step 2 Both are power pieces

1st piece

2nd piece

$$(y+1)^4$$

=

$$(x-1)^3$$

Step 3

$$4(y+1)^3$$

$$3(x-1)^2$$

Step 4

Inside derivative ($y+$) = y'

$(x-1) = 1$ Inside derivative

Step 5

$$4(y+1)^3 \cdot y'$$

$$3(x-1)^2$$

Step 6

Combine pieces

$$4(y+1)^3 \cdot y' = 3(x-1)^2$$

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