100

Ingrid Islas Vásquez A01570175

1) $y = \ln(3x-1)$

$y' = \frac{3}{3x-1}$ e

2) $h(x) = \ln\sqrt{x}$ $\quad u = (x)^{1/2}$ $\quad u' = \frac{1}{2}x^{-1/2}$

$h'(x) = \frac{1}{\sqrt{x}} \cdot \frac{1}{2\sqrt{x}}$ $\quad \frac{1}{2\sqrt{x}}$

$h'(x) = \frac{1}{2x}$ e

3) $f(x) = \sqrt{\ln x}$

$f(x) = (\ln x)^{1/2}$

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

$F'(x) = \frac{1}{2x\sqrt{\ln x}}$ e

4) $y = (\ln x)^3$

$y' = 3(\ln x)^2 \cdot \frac{1}{x}$

$y' = \frac{3(\ln x)^2}{x}$ e

5) $y = \ln x^2$

$y' = \frac{2x}{x^2}$

$y' = \frac{2}{x}$ e

6) $y = \ln\left(\frac{2x+1}{x-1}\right)$ $\quad \frac{1}{x} \cdot y'$

$y' = \log 2x+1 - \log x-1$

$y' = \log \frac{2}{2x+1} - \log \frac{1}{x-1}$

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

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

$y' = \frac{-3}{2x^2-x-1}$ e

7) $F(x) = x \ln x$

$u(x) = x \quad u'(x) = 1$

$v(x) = \ln x \quad v'(x) = \frac{1}{x}$

$F'(x) = x \cdot \frac{1}{x} + \ln x(1)$

$F'(x) = 1 + \ln x$ e

8) $f(x) = x^2 \ln x$

$u(x) = x^2 \quad u'(x) = 2x$

$v(x) = \ln x \quad v'(x) = \frac{1}{x}$

$F'(x) = x^2 \cdot \frac{1}{x} + \ln x(2x)$

$F'(x) = x + 2x \ln x$ e

9) $g(x) = \frac{\ln x}{x}$ $\quad u = \ln x$ $\quad u' = \frac{1}{x}$ $\quad v = x$ $\quad v' = 1$

$g'(x) = \frac{x(\frac{1}{x}) - \ln x(1)}{x^2} = \frac{1 - \ln x}{x^2}$ e

10) $g(x) = \frac{x}{\ln x}$ $\quad u = x \quad u' = 1$ $\quad v = \ln x \quad v' = \frac{1}{x}$

$$g'(x) = \frac{\ln x(1) - x\left(\frac{1}{x}\right)}{(\ln x)^2} = \frac{\ln x - 1}{(\ln x)^2}$$

11) $y = x(\ln x)^2$

$u = x \quad u' = 1$

$v = (\ln x)^2 \quad v' = 2(\ln x)\left(\frac{1}{x}\right) \rightarrow \frac{2\ln x}{x}$

$y' = x\left(\frac{2\ln x}{x}\right) + (\ln x)^2$

$y' = 2\ln x + (\ln x)^2$

12) $g(x) = \frac{\ln 2x}{\ln 3x}$ $\quad u = \ln 2x \quad u' = \frac{u = 2x}{u' = 2} \rightarrow \frac{2}{2x} = \frac{1}{x}$ $\quad v = \ln 3x \quad v' = \frac{u = 3x}{u' = 3} \rightarrow \frac{3}{3x} = \frac{1}{x}$

$$g'(x) = \frac{\ln 3x\left(\frac{1}{x}\right) - \ln 2x\left(\frac{1}{x}\right)}{(\ln 3x)^2}$$

$$g'(x) = \frac{\frac{\ln 3x}{x} - \frac{\ln 2x}{x}}{(\ln 3x)^2} = \frac{\frac{\ln 3x - \ln 2x}{x}}{(\ln 3x)^2}$$

$$g'(x) = \frac{\ln 3x - \ln 2x}{x(\ln 3x)^2}$$

13) $h(x) = x$

$h'(x) = 1$ e ✓

14) $y = x^2 + \ln x$

$u = x^2 \qquad v = \ln x$

$u' = 2x \qquad v' = \frac{1}{x}$ ✓

$y' = 2x + \frac{1}{x}$ e

15) $y = \frac{\ln x}{x^2+1} \qquad u = \ln x \quad u' = \frac{1}{x}$

$v = x^2+1 \quad v' = 2x$

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

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

$y' = \frac{\ln x}{x^2+1} \cdot \frac{\frac{x^2+1}{x} - x\ln x^2}{(x^2+1)^2} = \frac{\ln x\left(\frac{x^2+1}{x} - x\ln x^2\right)}{(x^2+1)^3}$