

$$(vi) \quad y = \frac{1-10x}{(2x-1)^2} \quad u = 1-10x \quad \frac{du}{dx} = -10 \quad v = (2x-1)^2 \quad \frac{dv}{dx} = 4(2x-1)$$

$$\frac{dy}{dx} = \frac{-10(2x-1)^2 - 4(2x-1)(1-10x)}{(2x-1)^4}$$

~~$$y = \frac{1-10x}{(2x-1)^2}$$~~

b) $y = \frac{1}{x} + \cos 2x$

$$\frac{dy}{dx} = -x^{-2} - 2 \sin 2x$$

$$\frac{d^2y}{dx^2} = 2x^{-3} - 4 \cos 2x$$

$$\frac{d^3y}{dx^3} = -6x^{-4} + 8 \sin 2x$$

$$\frac{d^4y}{dx^4} = 24x^{-5} + 16 \sin 2x$$

$$\frac{d^5y}{dx^5} = -120x^{-6} - 32 \sin 2x$$

c) $f(x) = \ln(\csc x - \cot x)$ $u = \csc x - \cot x$ $y = \ln u$ $\frac{dy}{du} = \frac{1}{u}$ $\frac{du}{dx} = -\csc x \cot x + \csc^2 x$

$$\frac{dy}{dx} = \frac{-\csc x \cot x + \csc^2 x}{\csc x - \cot x}$$

$$= \frac{\csc x (\csc x - \cot x)}{\csc x - \cot x}$$

$$= \csc x$$