

$$v) y = (x + \sin 2x)$$

$$\frac{dy}{dx} = 1 + 2\cos 2x$$

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

$$u = 1-10x$$

$$\frac{du}{dx} = -10$$

$$v = (2x-1)^2$$

$$\frac{dv}{dx} = 4(2x-1)$$

$$= 8x-4$$

$$\frac{dy}{dx} = \frac{-10(2x-1)^2 - (1-10x)(8x-4)}{(2x-1)^4}$$

$$= \frac{4x^2 - 4x + 1 + 80x^2 + 48x - 4}{(2x-1)^4}$$

$$= \frac{84x^2 + 44x - 3}{(2x-1)^4}$$

$$(1-10x)(8x-4)$$

$$8x-4-80x^2+40x$$

$$-80x^2+48x-4$$

$$(2x-1)(2x-1)$$

$$4x^2-4x+1$$

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

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

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

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

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

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

$$c) y = \ln(\operatorname{cosec} x - \cot x)$$

$$\frac{dy}{dx} = \frac{1}{\operatorname{cosec} x - \cot x} \cdot (-\operatorname{cosec} x \cot x + \operatorname{cosec}^2 x)$$

$$= \frac{-\operatorname{cosec} x \cot x + \operatorname{cosec}^2 x}{\operatorname{cosec} x - \cot x}$$

$$\operatorname{cosec} x (-\cot x + \operatorname{cosec} x)$$

$$(\operatorname{cosec} x - \cot x)$$

$$= \operatorname{cosec} x$$

$$\operatorname{cosec} x (-\cot x + \operatorname{cosec} x)$$

$$= \operatorname{cosec} x$$

$$= \operatorname{cosec} x$$