

V. $y = \overset{u}{x} + \overset{v}{\sin 2x}$

$$\frac{dy}{dx} du = 1$$

$$\frac{dy}{dx} dv = \cos 2x \cdot 2 = 2 \cos 2x$$

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

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

$$u = 1 - 10x \quad u' = -10$$

$$v = (2x-1)^2 \quad v' = 2(2x-1)$$

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

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

$$= \frac{2(10x+3)}{(2x-1)^3}$$

$$\frac{2(10x+3)}{(2x-1)^3}$$

B y

$$2. \int \frac{2x}{(4+3x^2)} dx$$

$$\int \frac{u-4}{3} (u)^{-1}$$

$$\int (2x) \times (4+3x^2)^{-1}$$

$$\int \frac{u-4}{3} (u)^{-1}$$

$$u = 4 + 3x^2$$

$$u-4 = 3x^2$$

$$\sqrt{\frac{u-4}{3}} = x$$

$$\frac{du}{dx} = 6x$$

$$dx = \frac{du}{6x}$$

ii $\int_4^8 e^{\frac{1}{2}x} dx = 12.778 \quad (3DP)$