

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

1.) c) $\ln(\operatorname{cosec} x - \cot x)$ show $f'(x) = \operatorname{cosec} x$

$$\frac{dy}{dx} = \frac{1}{u} \cdot \frac{d(u)}{dx} \quad \text{where } u = \operatorname{cosec} x - \cot x$$

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

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

$$\frac{dy}{dx} = \operatorname{cosec} x \quad \therefore$$

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

$$\int \frac{2x}{u} dx$$

$$\int 2x u^{-1} dx = -2x u^0 + C$$

$$= -2x(3x^2+4) + C$$

$$\frac{3x^2+4}{dx} = \frac{6x}{6x}$$

2.) B) $\int_0^4 e^{\frac{1}{2}x} dx$

$$2 \int_0^4 e^u du$$

$$2e^u \text{ where } u$$

$$2e^{\frac{x}{2}} + C$$

$$e^u = e^u$$

$$u = \frac{x}{2} = \frac{1}{2}$$

$$\frac{du}{dx} = dx = 2du$$

In Radians Answer =

$$12.7781122$$

$$12.78(2dp)$$

2.) B) $\int_0^4 \frac{5x+13}{(2x+)(x+4)} dx$

$$\int \frac{1}{ax+b} dx = \frac{1}{a} \ln |ax+b| + C$$

Answer in Radians =

$$3.98984087$$

$$3.99(2dp)$$