

Q2) (a) $\int \frac{2x}{(4+3x^2)} dx$

$$\frac{\ln(3x^2+4)}{3} + C$$

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

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

$$\frac{2}{6} \int \frac{1}{u} du$$

$$\int \frac{\ln u}{3}$$

$$= \frac{\ln(3x^2+4)}{3} + C$$

(ii) $\int_0^4 e^{1/2 x} dx$

$$\int e^{x/2} = 2e^{x/2}$$

$$\left[2e^{x/2} - 2e^{0/2} \right]$$

$$= 12.778 = \underline{2e^2 - 2}$$

(iii) $\int_0^4 \frac{5x+13}{(2x+1)(x+4)} dx$

$$5x+13 = A(x+4) + B(2x+1)$$

when $x = -4$

$$-7 = -7B$$

$$B = +1$$