INTEGRATING THE EXPONENTIAL FUNCTION

1 Write a primitive function for each of the following:

(a) e^{2x} **(b)** e^{5x} **(c)** $e^{-0.4x}$ **(d)** $5e^{2.5x}$ **(e)** $e^{x}+e^{-3x}$ **(f)** $e^{-2x}-e^{-x}$

a) $\int e^{2x}\,dx = \frac{1}{2}e^{2x} + C$

b) $\int e^{5x}\,dx = \frac{1}{5}e^{5x} + C$

c) $\int e^{-0.4x}\,dx = \frac{1}{(-0.4)}e^{-0.4x} + C = \frac{-5}{2}e^{-0.4x} + C$

d) $\int 5e^{2.5x}\,dx = 5 \times \frac{1}{2.5}e^{2.5x} + C = 2e^{2.5x} + C$

e) $\int e^{x}+e^{-3x}\,dx = e^{x} + \frac{1}{(-3)}e^{-3x} + C = e^{x} - \frac{1}{3}e^{-3x} + C$

f) $\int e^{-2x}-e^{-x}\,dx = \frac{1}{(-2)}e^{-2x} - \frac{1}{(-1)}e^{-x} + C$

$= -\frac{1}{2}e^{-2x} + e^{-x} + C$

2 Find: **(a)** $\int e^{-x}\,dx$ **(b)** $\int e^{\frac{x}{2}}\,dx$ **(c)** $\int e^{-3x}\,dx$

a) $\int e^{-x}\,dx = \frac{1}{(-1)}e^{-x} + C = -e^{-x}\,dx$

b) $\int e^{x/2}\,dx = 2e^{x/2} + C$

c) $\int e^{-3x}\,dx = \frac{1}{(-3)}e^{-3x} + C = -\frac{1}{3}e^{-3x} + C$

(d) $\int (e^{-t} - 1)\,dt$ (e) $\int (e^{2u} + u^2)\,du$ (f) $\int (e^{-2.5x} + e^{0.4x})\,dx$

d) $\int (e^{-t} - 1)\,dt = \frac{e^{-t}}{(-1)} - t + C = -e^{-t} - t + C$

e) $\int (e^{2u} + u^2)\,du = \frac{e^{2u}}{2} + \frac{u^3}{3} + C$

f) $\int (e^{-2.5x} + e^{0.4x})\,dx = \frac{e^{-2.5x}}{(-2.5)} + \frac{e^{0.4x}}{0.4} + C$

$= -\frac{e^{-2.5x}}{2.5} + \frac{e^{0.4x}}{0.4} + C$