MATH 34B INTEGRATION

Indefinite integrals

1. $\int \sin(3x)dx =$

2. $\int (4-3t)^8 dt =$

3. $\int (x^2 e^{3x^3} + x)dx =$

4. $\int (u\cos(u) + \sqrt{u})du$

Definite integrals

1. $\int_1^3 (t+3)(t-1)^9 dt =$

2. $\int_0^1 \int \frac{2y^2+1}{\sqrt{2y^3+3y+1}} dy =$

3. $\int_1^5 \frac{e^{\sqrt{y}}}{\sqrt{y}} dy =$

Differential equations

1. Solve the differential equation

$$\frac{dF}{dx} = \frac{5x^2}{x^3+1} \text{ with initial condition } F(0) = 1.$$

2. Solve the differential equation

$$\frac{dy}{dx} = x + \sin(5x) \text{ with initial condition } y(0) = 2.$$

3. Solve the differential equation

$$\frac{df}{dt} = (2t-1)(t+5)^5 \text{ with initial condition } f(0) = 0.$$

Area between graph of two functions

1. Find the area of the region between the graphs of $f(x) = x^2$ and $g(x) = \sqrt{x}$.

2. Find the area of the region between the graphs of $f(x) = e^{2x}$ and $g(x) = 4$.

3. Find the area of the region between the graphs of $f(x) = \cos x$ and $g(x) = \sin x$ on the interval $[0, \frac{\pi}{4}]$.