BSc 2 Software Design (Game/Web Dev)
Integral Calculus Tutorial I

Integration by Parts
Evaluate each of the following integrals:

1. $\int_{0}^{\pi/2} \left(4x^2 - 3x + 2\right)\cos(x)\,dx$

2. $\int 3^x e^x\,dx$

3. $\int \cos(x)\cosh(x)\,dx$

4. $\int_{-\pi/2}^{\pi/2} (4x+2)\sin(x)\,dx$

5. $\int \left(4x^3 - 3x + 2\right)4^x\,dx$

6. $\int e^x \sin(x)\,dx$

Integration by Substitution
Evaluate each of the following integrals:

1. $\int 2x^3 \sin(x^4)\,dx$

2. $\int \dfrac{-5x^2}{\sqrt{1-x^3}}\,dx$

3. $\int e^{a^x} a^x\,dx$

4. $\int \cosh^n(x)\sinh(x)\,dx; \quad \forall n \in \mathbb{N}$

5. $\int_{0}^{\pi} \sin^{2n-1}(x)\cos(x)\,dx; \quad \forall n \in \mathbb{N}$

6. $\int_{0}^{\pi} \dfrac{112x - 72}{7x^2 - 9x + 5}\,dx; \quad \forall n \in \mathbb{N}$

Rational Functions Using Partial Fractions
Evaluate each of the following

1. $\int \dfrac{x+3}{x^2 - x - 12}\,dx; \quad \forall n \in \mathbb{N}$

2. $\int \dfrac{2x-4}{3x^2 - 14x - 5}\,dx; \quad \forall n \in \mathbb{N}$

3. $\int \dfrac{x+7}{(x-4)(x-2)(x+1)}\,dx; \quad \forall n \in \mathbb{N}$

4. $\int \dfrac{2x^3 - 6x^2 + 5x - 4}{(x-4)(x+2)(x-1)(x+5)}\,dx; \quad \forall n \in \mathbb{N}$