Math 182 Honors Quiz 2 Version A

1. Solve the following integration problems:

(i) $\displaystyle\int \cos^2(x+1)\, dx$

(ii) $\displaystyle\int \frac{1}{x^2 + 4x}\, dx$

(iii) $\displaystyle\int xe^{-x}\, dx$

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2. Prove the following theorems:

   (i) Integration by Parts. If f' and g' are continuous, then

$$\int f(x)g'(x)\,dx = f(x)g(x) - \int f'(x)g(x)\,dx.$$

   (ii) The Substitution Formula. If f and g' are continuous, then

$$\int_{g(a)}^{g(b)} f(u)\,du = \int_a^b f(g(x)) \cdot g'(x)\,dx.$$