Quiz #3 - Substitute Questions

Note Title 9/17/2009

If you correctly compute the answer to the following three problems and submit your answers by Friday, Sep. 18, 2009, I will add up to 3 points to your last quiz. Your answer must be given in terms of x, and you must show your work.

① $\int \frac{1}{x^2\sqrt{1+x^2}}\,dx$

② $\int \frac{x}{\sqrt{1-x^2}}\,dx$

③ $\int \frac{x^2}{\sqrt{1-x^2}}\,dx$

Hints: One problem is relatively easy. Another requires using both the half-angle formula (to help integrate) and the double-angle formula (to help resubstitute). Recall:

$\sin^2(\theta) = \frac{1}{2}(1-\cos(2\theta))$ (half-angle formula)

$\sin(2\theta) = 2\sin(\theta)\cos(\theta)$ (double-angle formula)

The remaining problem might two substitutions, one "inverse", one regular. Good luck!