Name: _____ **Section:** _____

Names of collaborators: _____

Main Points:

1. Synthesize what we have learned
2. Practice!

At this point, we have learned many techniques of integration: rewrite integrand (using basic algebra, trig identities, or partial fraction decompositions), perform a substitution (simple or trig substitution), use integration by parts. We often use one technique after another. You develop instincts through experience. Now is the time to practice!

Exercises. Evaluate the integrals. State, in words, what techniques you use.

1. $\displaystyle\int \frac{x}{\sqrt{4-x^2}}\,dx$

2. $\displaystyle\int_0^1 \frac{e^{\arctan y}}{1+y^2}\,dy$

3. $\int \theta \sin^2 \theta \, d\theta$

4. $\int x^2(1-x^2)^{-1/2} \, dx$

5. $\displaystyle\int \frac{1}{e^{3x} - e^x}\, dx$

   Hint: Start with the substitution $u = e^x$. Then $du = e^x\, dx$. This implies $dx = (1/u)du$.

6. $\int x \sin^2 x \cos x \, dx$

   Hint: Start with IBP. Let $u = x$ and $dv = \sin^2 \cos x \, dx$.