MATH-265
Calculus III
21 March 2013 Trig Sub Review

(points) 1. If you have something like $\sqrt{a^2 - x^2}$ in your integral, you MAY want to make a substitution $x = a\sin\theta$, although this is sometimes unnecessary. This may require a little manipulation first.

(a) $\int \sqrt{16 - 5x^2}dx$

(b) $\int_0^{1/2} \frac{x^2}{\sqrt{1 - x^2}}dx$

(c) $\int x^3\sqrt{9 - x^2}dx$

(d) $\int x^2\sqrt{9 - 5x^2}dx$ (compare with previous (c.))

(points) 2. If you have something like $\sqrt{x^2 + a^2}$ in your integral, you MAY want to make a substitution $x = a\tan\theta$, although this is sometimes unnecessary. This may require a little manipulation first.

(a) $\int_{1/2}^{1} \frac{dx}{x^2\sqrt{x^2 + 4}}$

(b) $\int \frac{dx}{\sqrt{x^2 + 1}}$

(c) $\int \sqrt{12 + 4t^2}dt$

(d) $\int \frac{dx}{25x^2 + 2}$

(e) $\int_0^{1} \frac{dx}{(4 + 9x^2)^2}$

(points) 3. If you have something like $\sqrt{x^2 - a^2}$ in your integral, you MAY want to make a substitution $x = a\sec\theta$, although this is sometimes unnecessary. This may require a little manipulation first.

(a) $\int \frac{dx}{x\sqrt{x^2 - 9}}$

(b) $\int \frac{x}{\sqrt{x^2 - 9}}dx$ (compare with previous; is there a non-trig sub you can do for this one?)

(c) $\int \frac{dx}{(3x^2 - 4)^{3/2}}$

(d) $\int \frac{dt}{t^2\sqrt{t^2 - 25}}$