MTH 32 LECTURE NOTES (Ojakian)

Topic 8: Trigonometric Integrals

OUTLINE

(References: 3.2)

1. Trigonometric Integrals (just with sin and cos)

2. Exponents - odd versus even ...

1. <u>Key Formulas</u>

   (a) Trigonometric Identities

      i. $\sin^2 x + \cos^2 x = 1$ (and ones derived from it)

      ii. $\sin^2 x = \frac{1-cos(2x)}{2}$

      iii. $\cos^2 x = \frac{1+cos(2x)}{2}$

   (b) Integration Formulas

      i. Integrals of: $\sin x$, $\cos x$

2. <u>General Strategy</u>

   PROBLEM 1. *First a basic substitution* $\int \sin^5 x \ \cos x \ dx$.

   PROBLEM 2. *Find* $\int \sin^2 x \ \cos^3 x \ dx$.

   General Strategy:

   (a) Plan to $u-$substitute for one of the trig functions

   (b) Use trig identities to convert the expression to one with just the "u" and an extra trig function for the "du".

   (c) Make the substitution and continue as usual

   PROBLEM 3. *Find* $\int \sin^3 x \ dx$

3. <u>Even Exponent Case</u>
   Strategy: Use Half-Angle Formulas

   PROBLEM 4. *Evaluate* $\int \sin^2 \theta \ d\theta$

   PROBLEM 5. *Evaluate* $\int \sin^4 \theta \ d\theta$

4. <u>Practice Problems</u>

   PROBLEM 6. *From* WORK BOOK, *do section 15: #3*