MA 114 Worksheet #02: Special Trigonometric Integrals

1. Compute the following integrals:

   (a) $\int \sin(x)\sec^2(x)\,dx$

   (b) $\int \sin^3(x)\,dx$

   (c) $\int_0^{\pi/2} \cos^2(x)\,dx$

   (d) $\int \sqrt{\cos(x)}\sin^3(x)\,dx$

   (e) $\int_0^{2\pi} \sin^2\left(\frac{1}{3}\theta\right)\,d\theta$

   (f) $\int_0^{\pi/2} (2-\sin(\theta))^2\,d\theta$

   (g) $\int 4\sin^2(x)\cos^2(x)\,dx$

   (h) $\int \cos^5(x)\,dx$.

2. Find the anti-derivative $\int \cot(x)\,dx$. Hint: Substitute $u = \sin(x)$.

3. Evaluate $\int \sin x \cos x\,dx$ by four methods:

   (a) the substitution $u = \cos(x)$;

   (b) the substitution $u = \sin(x)$;

   (c) the identity $\sin 2x = 2\sin(x)\cos(x)$;

   (d) integration by parts

   Explain the different appearances of the answers.

4. Find the area of the region bounded by the curves $y = \sin^2(x)$ and $y = \sin^3(x)$ for $0 \le x \le \pi$.

MA 114 MathExcel Worksheet # 02: Special Trigonometric Integrals

1. Evaluate the following integrals
   (a) $\int x \sin^2(x^2)\, dx$
   (b) $\int \tan^2(x) \cos^3(x)\, dx$
   (c) $\int \tan^2(x) + \tan^4(x)\, dx$
2. Evaluate $\int \sin(4x)\cos(5x)\, dx$ using the identity $\sin A \cos B = \frac{1}{2}(\sin(A-B) + \sin(A+B))$