

MA 114 Worksheet #02: Special Trigonometric Integrals

1. Compute the following integrals:

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

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

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

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

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

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

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

(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 $0 \leq x \leq \pi$.

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 $\sin A \cos B = \frac{1}{2} (\sin(A - B) + \sin(A + B))$