# MAT137 Lecture 27

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# Agenda

Integration of trigonometric functions

Integration by trigonometric substitution

# Integration of trigonometric functions

For each of the following integrals, state the substitution one should use

(a) $\displaystyle\int \sin^5 x \, \mathrm{d}x$

(b) $\displaystyle\int \cos^3 x \, \mathrm{d}x$

(c) $\displaystyle\int \sin^5 x \cos^4 x \, \mathrm{d}x$

(d) $\displaystyle\int \sin^4 x \cos^5 x \, \mathrm{d}x$

(e) $\displaystyle\int \sqrt{\cos x + 1} \sin^9 x \, \mathrm{d}x$

# Integration of trigonometric functions

Evaluate

$$\int \sin^2 x \cos^2 x \, \mathrm{d}x.$$

# Integration of trigonometric functions

For each of the following integrals, state the substitution one should use

(a) $\int \tan^4 x \sec^4 x \, \mathrm{d}x$

(b) $\int \tan^5 x \sec^3 x \, \mathrm{d}x$

(c) $\int \tan x \, \mathrm{d}x$

(d) $\int \tan^3 x \, \mathrm{d}x$

(e) $\int \tan^2 x \cos^3 x \, \mathrm{d}x$

# Integration of trigonometric functions

Use integration by parts to evaluate

$$\int \sec^3 x \, \mathrm{d}x.$$

*Hint.* Let $u = \sec x$ and $\mathrm{d}v = \sec^2 x \, \mathrm{d}x$.

# Integration of trigonometric functions

Evaluate

$$\int \tan^4 x \, \mathrm{d}x.$$

*Hint.* Write $\tan^2 x = \sec^2 x - 1$.

# Next Class: Thursday February 1

Watch videos 9.15, 9.16, 9.17 in Playlist 9.