

MATH 1100-A 2008 Quiz 15

Feb. 10, 2009

Sections 7.1, 7.2.

Evaluate

1. (2.5 pts)

$$\int_0^{\frac{\pi}{2}} 2\pi x \cos x dx$$

*Solution:*

$$\begin{aligned} & \int_0^{\frac{\pi}{2}} 2\pi x \cos x dx \\ &= 2\pi [x \sin x]_0^{\frac{\pi}{2}} - 2\pi \int_0^{\frac{\pi}{2}} \sin x dx \\ &= 2\pi \cdot \frac{\pi}{2} - 0 - 2\pi [-\cos x]_0^{\frac{\pi}{2}} \\ &= \pi^2 + 2\pi(0 - 1) = \pi^2 - 2\pi. \end{aligned}$$

□

2. (2.5 pts)

$$\int \tan x \sec^4 x dx$$

*Solution:* Let  $u = \tan x$ .  $du = \sec^2 x dx$ .  $\sec^2 x = 1 + \tan^2 x = 1 + u^2$ .

$$\begin{aligned} & \int \tan x \sec^4 x dx \\ &= \int \tan x \sec^2 x \sec^2 x dx \\ &= \int u(1 + u^2) du \\ &= \int (u + u^3) du = \frac{u^2}{2} + \frac{u^4}{4} + C \\ &= \frac{\tan^2 x}{2} + \frac{\tan^4 x}{4} + C. \end{aligned}$$