Quiz 5 Name: Key

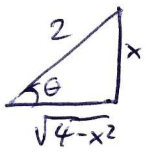
Math 201 F01 02/21/12

Compute the following indefinite integrals:

1. $\int \frac{1}{x^2\sqrt{4-x^2}}\,dx$ $= \int \frac{1}{4\sin^2\theta \, 2\cos\theta} 2\cos\theta\, d\theta = \frac{1}{4}\int \csc^2\theta\, d\theta$

$= -\frac{1}{4}\cot\theta + C$

$= -\frac{1}{4}\frac{\sqrt{4-x^2}}{x} + C$



$\frac{x}{2} = \sin\theta$

$x = 2\sin\theta$

$dx = 2\cos\theta\, d\theta$

$\frac{\sqrt{4-x^2}}{2} = \cos\theta$

$\sqrt{4-x^2} = 2\cos\theta$

2. $\int \sec^3 x \tan^3 x\, dx$ $= \int (\sec^2 x)(\tan^2 x)(\sec x \tan x)\,dx$

$= \int (\sec^2 x)(\sec^2 x - 1)(\sec x \tan x)\,dx$

$u = \sec x$

$du = \sec x \tan x\, dx$

$= \int u^2(u^2-1)\,du$

$= \int u^4 - u^2\,du$

$= \frac{u^5}{5} - \frac{u^3}{3} + C$

$= \frac{\sec^5 x}{5} - \frac{\sec^3 x}{3} + C$