Calculus II. Quiz 3b. Name Key Time

Show all work on this page for full and/or partial credit. Put a box around your final answers in each part.

1. Find the indefinite integral. $\int \cos^6 x \sin^3 x dx$

No calculator: make sure to use the method from the video!

$= \int \cos^6 x \sin^2 x \sin x \, dx$

$= \int \cos^6 x (1-\cos^2 x) \sin x \, dx$

$u = \cos x$

$du = -\sin x \, dx$

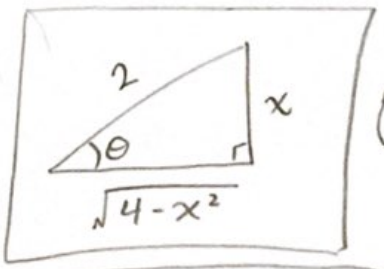
$-du = \sin x \, dx$

$= \int -u^6 (1-u^2) \, du$

$= \int (-u^6 + u^8) \, du$

$= -\frac{u^7}{7} + \frac{u^9}{9} + C = \boxed{-\frac{\cos^7 x}{7} + \frac{\cos^9 x}{9} + C}$

2. Find the indefinite integral. $\int \sqrt{4-x^2} dx$



$\left(\sin\theta = \frac{x}{2}, \quad \cos\theta = \sqrt{4-x^2}/2\right)$

$x = 2\sin\theta$

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

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

$\int \sqrt{4-x^2} \, dx$

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

$= \int 4\cos^2\theta \, d\theta$

$= \int 4\left(\frac{1+\cos 2\theta}{2}\right) d\theta$

$= \int (2 + 2\cos 2\theta) \, d\theta$

$= 2\theta + 2\left(\frac{\sin 2\theta}{2}\right) + C$ *

$= 2\theta + 2\sin\theta\cos\theta + C$

$= \boxed{2\sin^{-1}\left(\frac{x}{2}\right) + \frac{x\sqrt{4-x^2}}{2} + C}$

* Alternate answer

$= 2\sin^{-1}\left(\frac{x}{2}\right) + \sin\left(2\sin^{-1}\left(\frac{x}{2}\right)\right) + C$