Math 21B, Fall 2023.

Discussion Problems 5 (Thu., Oct. 26)

1. Compute:

(a) $\int x^3 e^{x^2}\, dx$ (b) $\int \arcsin x\, dx$

After solving (b), you have 30 seconds to solve (c) $\int \arccos x\, dx$.

2. Compute:

(a) $\int \sin(3x) \cos(4x)\, dx$ (b) $\int \sin^4 x \cos^4 x\, dx$ (*Hint*: $\sin(2x) = 2\sin x \cos x$)

(c) $\int (\sin 2x)^3 \sin^2 x\, dx$ (d) $\int \dfrac{\tan x}{\cos^2 x}\, dx$

3. Compute:

(a) $\int_{-\pi}^{\pi} (\sin 2x)^3 \sin^2 x\, dx$ (b) $\int_{-\pi}^{17\pi} (\sin 2x)^3 \sin^2 x\, dx$ (c) $\int_{-\pi/2}^{\pi/2} \cos^2(2x)\, dx$

4. Compute $\int \dfrac{x^2}{\sqrt{x^2 + 9}}\, dx$. (Try trigonometric substitution $x = 3\tan\theta$ to get to integral of $\sin^2\theta / \cos^3\theta$, then integrate by parts with $u = \sin\theta$. This is a hard problem, not suitable for an exam.)