

Math 125 D Winter 2024
Mid-Term Exam Number Two
February 22, 2024
Answers

There were two versions.

Version A: Problem 1(a) involved "3x"

1. (a) $\frac{2}{3}\sqrt{3x-10} - \frac{8}{3}\tan^{-1}\left(\frac{1}{4}\sqrt{3x-10}\right) + C$

(b) $-\ln|x+2| + 2\ln|x+3| + C$

2. (a) $\frac{1}{81}\left(\frac{\sqrt{x^2-9}}{x} - \frac{(x^2-9)^{3/2}}{3x^3}\right) + C = \frac{(2x^2+9)\sqrt{x^2-9}}{243x^3} + C$

(b) $\frac{1}{13}\tan^{13}x + \frac{2}{11}\tan^{11}x + \frac{1}{9}\tan^9x + C$

3. $5\pi = 15.70796\dots$

4. $\rho g \int_0^{1.5} (3-y)(2)\left(1 + \frac{2}{3}y\right) dy$

5. $\frac{\pi}{6}$ and $\frac{5\pi}{6}$ are two possible answers.

Version V: Problem 1(a) involved "2x"

1. (a) $\sqrt{2x+5} - 3\tan^{-1}\left(\frac{\sqrt{2x+5}}{3}\right) + C$

(b) $\frac{2}{3}\ln|x+4| + \frac{1}{3}\ln|x+1| + C$

2. (a) $\frac{\sqrt{x^2-4}}{16x} - \frac{(x^2-4)^{3/2}}{48x^3} + C = \frac{(x^2+2)\sqrt{x^2-4}}{24x^3} + C$

(b) $\frac{1}{15}\tan^{15}x + \frac{2}{13}\tan^{13}x + \frac{1}{11}\tan^{11}x + C$

3. $3024\pi = 9500.17\dots$

4. $\rho g \int_0^3 (6-y)(4)\left(2 + \frac{2}{3}y\right) dy$

5. $\frac{\pi}{3}$ and $\frac{5\pi}{3}$ are two possible answers.