

MATH 132, SEC. 21, SAMPLE MIDTERM 4 ANSWERS

1. a. $\frac{1}{2}x^4 - 3x + C$
 - b. 0
 - c. $\frac{\pi}{2}$
 - d. 0
 - d. $\frac{1}{2} \cos^2(1/\theta) + C$ or $\frac{-1}{2} \sin^2(1/\theta) + C$
 - e. $\frac{\sqrt{10}-3}{2}$
 - f. $\frac{-1}{9}$. (Actually, the integral doesn't converge, but if you noticed this, I don't think you have to worry too much about the exam.)
 - g. $3\pi^2$
 - h. $e^{-1/2x^2}$
 - i. $\sqrt{1 - 2 \sin^2(x^3)} 3x^2 - \sqrt{1 - 2 \sin^2 x}$
2. $\Delta x = 3/n$; $x_k = 1 + \frac{3k}{n}$; $\sum_{k=1}^n f(x_k) \Delta x = \sum_{k=1}^n 2(1 + 3k/n)3/n = \sum_{k=1}^n 6/n + 18k/n =$
- $$\frac{6}{n} \sum_{k=1}^n 1 + \frac{18}{n^2} \sum_{k=1}^n k = \frac{6}{n}n + \frac{18}{n^2} \frac{(n+1)(n)}{2}; \quad \int_1^4 2x dx = \lim_{n \rightarrow \infty} \sum_{k=1}^n f(x_k) \Delta x = \lim_{n \rightarrow \infty} \left(6 + 9 \frac{n^2 + n}{n^2} \right) =$$
- 15
3. $(\sin 0 + \sin \frac{\pi}{4} + \sin \frac{\pi}{2} + \sin \frac{3\pi}{4}) \frac{\pi}{4} = \frac{(1+\sqrt{2})\pi}{4}$
 4. $3 \cdot 5 - 5 \left(\frac{5 \cdot 6}{2} \right)^2$
 5. $26/3$
 6. $14/9$