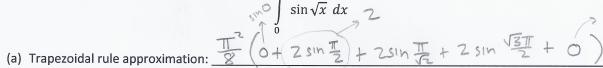
## MATH 202 Quiz 9 – Version A

November 3, 2015

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Instructions: No calculators! Use your own scrap paper and write your answers in the space provided.

1. For the given integral, use n=4 to approximate it using the indicated technique:



- (b) Simpson's rule approximation:  $\frac{\mathbb{T}^2}{\mathbb{T}^2} \left( 0 + 4 \sin \frac{\mathbb{T}}{2} + 2 \sin \frac{\mathbb{T}}{2} + 4 \sin \frac{\mathbb{T}}{2} + 0 \right)$ (c) Midpoint rule approximation:  $\frac{\mathbb{T}^2}{\mathbb{T}^2} \left( \sin \frac{\mathbb{T}}{18} + \sin \frac{\mathbb{T}}{2} \mathbb{T} + \sin \frac{\mathbb{T}}{2} \mathbb{T} + \sin \frac{\mathbb{T}}{2} \mathbb{T} \right)$
- 2. For the above approximations, what is the error associated with:
  - (a) The Trapezoidal rule:  $E_T = \frac{\sqrt{T^6/12}n^2}{\sqrt{12}n^2}$
  - (b) The Midpoint rule:  $E_M = \frac{\sqrt{16} \sqrt{24} \sqrt{16}}{\sqrt{16}}$
- 3. How large must n be to have an approximation to with 0.01 accuracy using the Trapezoidal rule?

$$n > \frac{100 \times 76}{12} = \frac{25 \times 76}{3} = 57^{3} \times \frac{1}{3}$$

4. If the integral below converges, find its value. If it diverges, state so:

(a) 
$$\int_{-\frac{\pi}{2}}^{\infty} \frac{x^2}{9 + x^6} dx = \frac{\pi}{9}$$
 (b)  $\int_{0}^{1} \frac{\ln x}{\sqrt{x}} dx = \frac{\pi}{9}$  (c)  $\int_{0}^{\infty} x^2 \ln x dx = \frac{8}{3} \ln 2 - \frac{8}{9}$  (d)  $\int_{0}^{\infty} x^2 e^{-x^3} dx = \frac{1}{3}$ 

5. Use the comparison theorem to determine if the integral converges or diverges:

(a) 
$$\int_{0}^{\infty} \frac{\arctan x}{2 + e^{x}} dx$$
  
This integral converges diverges (circle one). I compared it to:  $\frac{1}{2}$  (state an integral)

$$(b) \int_{1}^{\infty} \frac{x+1}{\sqrt{x^4 - x}} \, dx$$

(b) 
$$\int_{1}^{x} \frac{x+1}{\sqrt{x^4-x}} dx$$
  
This integral converges/diverges (circle one). I compared it to: \_\_\_\_\_\_\_ (state an integral)

## **Bonus:**

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1. Compute the area between the two given curves: