

## Midterm 2 Practice Midterm

### 1 True/False

For each of the following questions respond true if the statement is true and false if the statement is false. If your response is false give a counter example or explain why.

1. It is possible for the sum of infinitely many numbers to converge.
2. A Riemann sum with a finite partition is exactly equal to the corresponding definite integral.
3.  $\int_a^b f(x)dx = \int_a^c f(x)dx - \int_b^c f(x)dx.$
4. For an increasing function the left Riemann sum method always overestimates the definite integral.

## 2 Free response

1. Evaluate the following sum:  $\sum_{k=1}^7 k \sin\left(\frac{k\pi}{2}\right)$

2. Represent the following sum in Sigma notation and then evaluate it:  
 $S=1+3+5+7+\dots+15$

3. Use the Riemann Sum definition of the definite integral to evaluate

$$\int_0^3 (2x + 4) dx$$

4. If the velocity function of an object starting at the origin is given as

$$v(t) = \begin{cases} 2t & : t \in [0, 5] \\ 10 & : t \in [5, \infty) \end{cases}$$

Find the location of the object at  $t=20$  and at  $t=50$ .

5. If  $G(x) = \int_x^{\pi/4} (s - 2) \cot(2s) ds$  for  $0 < x < \pi/2$  find  $G'(x)$

6. If  $H(x) = \int_{-x^2}^{x^2} \frac{t^2}{1+t^2} dt$  find  $H'(x)$

7. Evaluate the definite integral  $\int_0^2 (2x^4 - 3x^2 + 5)dx$

8. Evaluate the definite integral  $\int_0^{\sqrt{\pi-4}} \frac{x \sin(\sqrt{x^2+4})}{\sqrt{x^2+4}} dx$

9. Find the average value of the function  $f(x) = x \cos x^2$  on the interval  $[0, \sqrt{\pi}]$

10. Find all values of  $c$  which satisfy the mean value theorem for the function  $g(x) = x(1 - x)$  on the interval  $[0, 1]$