

Math 241
Spring 2018
Exam 3 - Practice
4/9/18
Time Limit: 50 Minutes

Name (Print): _____

Problem	Points	Score
1	20	
2	20	
3	50	
4	15	
5	15	
6	20	
7	20	
Total:	160	

1. (20 points) a) In the space below, draw a reasonable sketch of $f(x) = \sqrt{x} + 1$ and draw 3 equal width rectangles associated to the lower (Riemann) sum approximation on the interval $[0, 9]$.

b) Express the area above in sigma notation.

c) Is this an overestimate or an underestimate?

2. (a) (10 points) Set up a definite integral which gives the area of a circle with radius 2.

- (b) (10 points) Let $G(x) = \int_1^x 1 - t^2 \, dt$. Determine the intervals of increase/decrease and concavity for G .

3. (a) (10 points) $\int \frac{1}{\sqrt{x}} + \cos(2x + 1) + 2 \, dx$

(b) (10 points) $\int \frac{x + 1}{(x^2 + 2x)^3} \, dx$

(c) (10 points) $\int_0^9 \sqrt{\sin(\pi x)} \cos(\pi x) \, dx$

(d) (10 points) $\int (x + 1)^{50} x \, dx$

(e) (10 points) $\int \frac{x^2 + 2x + 1}{x^{3/2}} \, dx$

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4. (15 points) Find the area of the region bounded by $f(x) = \frac{1}{x^2}$, $g(x) = 3x$ and $h(x) = x$.

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5. (15 points) Let $F(x) = \int_x^{x^2} \cos(t^3) dt$. Determine $F'(x)$.

6. (a) (10 points) Find $\int_{-4}^3 |x^2 - 1| \, dx$.

(b) (10 points) Find $\int \frac{\sqrt{\sqrt{\sin(x)} + 1} \cos(x)}{\sqrt{\sin(x)}} \, dx$

7. (20 points) a) Give all values of b such that $\int_1^b 3x^2 - 3 \, dx = 0$.

b) Set up integrals which give area of the region bounded by the first quadrant and the lines $y = \sqrt{x}$ and $y = x - 2$. One integrating with respect to x and the other integrating with respect to y .