

ADVANCED CALCULUS II, DR. BLOCK, SPRING 2020 EXAM 3

Note: There are 7 problems worth 7 points each, and 1 additional point will be added. So the highest possible score is 50. You should show all of your work for each problem. You are allowed to use any course notes and the text. You are not allowed to use other sources. You can ask me a question, and I will decide if I can give you an answer. You are not allowed to consult with anyone else about the exam.

Your work is due Friday, April 3. Please submit your work on Canvas. Please sign your name below the pledge:

On my honor, I have neither given nor received unauthorized aid in doing this assignment.

1. Evaluate:

$$\frac{d}{dx} \int_{5x^2}^{\cos x} e^{t^3} dt$$

2. Evaluate the integral:

$$\int_0^2 x^3 \sqrt{x^2 + 4} dx$$

3. Evaluate the improper integral.

$$\int_1^{\infty} x e^{-2x} dx$$

4. Use Comparison to determine whether the given improper integral converges or diverges.

$$\int_0^1 \frac{1}{x(x^2 + 3)} dx$$

5. Evaluate the limit:

$$\lim_{x \rightarrow \infty} \frac{1}{x} \int_1^x \frac{\sin t}{t^2} dt$$

6. Evaluate the limit:

$$\lim_{x \rightarrow \infty} \frac{1}{x^2} \int_1^x \sqrt{t^2 + t + \sin^2 t + 1} dt$$

7. Evaluate the limit:

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{n}{(k+3n)^2}$$