MATH 142: Exam 1 **Name:** _____
Spring —$_1$ 2026
02/12/2026
75 Minutes

Write your name on the appropriate line on the exam cover sheet. This exam contains 10 pages (including this cover page) and 9 questions. Check that you have every page of the exam. Answer the questions in the spaces provided on the question sheets. Be sure to answer every part of each question and show all your work. If you run out of room for an answer, continue on the back of the page — being sure to indicate the problem number.

Question	Points	Score
1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
8	10	
9	10	
Total:	90	

1. (10 points) Showing all your work and completely simplifying your result, compute the following:

$$\int_0^{\pi} x \sec^2\left(\frac{x}{4}\right)\, dx$$

2. (10 points) Determine whether the integral below converges or diverges. If it converges, find its value. If it diverges, explain why. Be sure to show all your work and full simplify your answer.

$$\int_{-\infty}^{1/\sqrt{3}} \frac{dx}{1+x^2}$$

3. (10 points) Showing all your work and completely simplifying your result, compute the following:

$$\int \frac{-3x^2 + 4x + 8}{(2x + 1)(x^2 + 5)}\, dx$$

4. (10 points) Showing all your work and completely simplifying your result, compute the following:

$$\int (2x+1)^3 \, e^{-x} \, dx$$

5. (10 points) Showing all your work and completely simplifying your result, compute the following:

$$\int \sec^8(\theta)\tan^3(\theta)\,d\theta$$

6. (10 points) Showing all your work and completely simplifying your result, compute the following:

$$\int x\sqrt{x-5}\,dx$$

7. (10 points) Showing all your work and completely simplifying your result, compute the following:

$$\int e^x \sin(3x)\, dx$$

8. (10 points) Showing all your work and completely simplifying your result, compute the following:

$$\int \frac{2}{x^2\sqrt{x^2+4}}\,dx$$

9. (10 points) Showing all your work and completely simplifying your result, compute the following:

$$\int \frac{x^6}{x^{14}+1}\,dx$$