Rubric for Assignment #1
Name:

Description	**Points Out of**	**Points Awarded**
Matrix inversion	3	
Hessian vs Jacobian matrix	2	
Derivative of a function	2	
Min and max of a function	3	
Computer specifications	2	
Programming language	2	
Shared and distributed memory parallelism	2	
Emphasis on optimization	2	
Introduce yourself on Canvas	2	
Total	**20**	

Comments:

Assignment # 1 (20 Pts)

Assigned: January 22, 2026 (Thursday)
Due date: January 29, 2026 (Thursday)

1. (3 pts) Calculate the inverse of the following 3 x 3 matrix

$$A = \begin{bmatrix} \frac{2}{3} & \frac{-2}{3} & \frac{1}{3} \\ \frac{1}{3} & \frac{2}{3} & \frac{2}{3} \\ \frac{2}{3} & \frac{1}{3} & \frac{-2}{3} \end{bmatrix}$$

2. (2 pts) What is the difference between a Hessian Matrix and a Jacobian Matrix?

3. (2 pts) Calculate the derivative of the function

$$F(x) = 4x^4 - 9x^2 + 6x - 12$$

at x = 3

4. (3 pts) Find the maximum and minimum values of $F(x) = 2x^3 - 3x^2 - 12x + 4$ in the interval [-2, 3].

5. (2 pts) What are the computing specifications of your most used computer (the computer where you are likely going to work on your class assignments and projects for this course) - Operating system, processor spec, memory?

6. (2 pts) List any programming languages you have used before and indicate which one you are most comfortable with.

7. (2 pts) In your own words, describe the difference between (a) shared-memory parallelism, and (b) distributed-memory parallelism. Provide a brief example of a context where each is commonly used.

8. (2 pts) Do you think there is enough emphasis on engineering design optimization in the industry today? Why or why not?

9. (2 pts) Introduce yourself on the course Canvas discussion board. Mention your year, major, background, interests, and anything else you'd like the class to know.