

Name: _____

4-digit code: _____

- Write your name and the last 4 digits of your SSN in the space provided above.
- The test has five (5) pages, including this one.
- You must show sufficient work to justify all answers unless otherwise stated in the problem. Correct answers with inconsistent work may not be given credit.
- Credit for each problem is given in parentheses at the right of the problem number.
- No books or notes may be used on this test. The use of graphing calculators is acceptable.

Page	Max. points	Your points
2	25	
3	25	
4	25	
5	25	
Total	100	

Problem 1 (25 pts). Sketch and identify the curve defined by the parametric equations

$$\begin{cases} x = t^2 - 2t, \\ y = t + 1, \end{cases} \quad \text{for } -2 \leq t \leq 2.$$

Problem 2 (25 pts). Consider the curve with polar equation $r = 2 \cos \theta - 2 \sin \theta$.

- (a) Find a cartesian equation for this curve.
- (b) Sketch its graph. Make sure that the sketch carries all relevant information.

Problem 3 (25 pts). Compute the length of the cardioid $r = 1 + \cos \theta$.

Problem 4 (25 pts). Find the area enclosed by one loop of the four-leaved rose $r = \cos 2\theta$.