

**First Examination**  
*Monday, March 15, 1999*

**Instructions:** This exam should be done on your own paper. Your name should be on each sheet and on the back of the last sheet; the answers should appear written carefully and in order. If in doubt, show intermediate steps: Full credit may not be given, even for correct answers, unless work is arranged clearly. This exam is closed book. You may leave after handing in your exam paper, but be sure to check your answers carefully. Each problem is worth 20 points.

1. Find the derivative function for  $f(x) = 1 - x + x^2$  algebraically.
2. If  $f$  is as in Figure 1, then sketch a graph of  $f'$ .

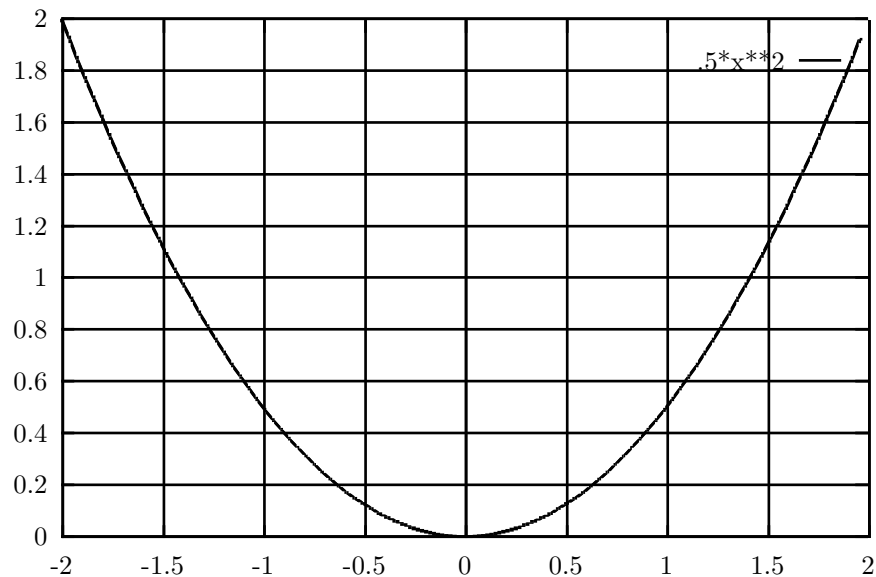


Figure 1: The graph for Problem 2

3. The cost function of a paper recycling plant is given in the following table. Estimate the marginal cost at  $q = 2000$ , and give units with your answer. Interpret your answer in terms of cost. At approximately what value of  $q$  does the marginal cost appear smallest?

$q$ (tons of recycled paper)	1000	1500	2000	2500	3000	3500
$C(q)$ (dollars)	2500	3200	3640	3825	3900	4400