7. [10 points] An amusement park is trying to decide how much to charge its visitors for admission. Consultants have predicted that, if the admission price were p, the daily number of visitors v would be given by

$$v = 5,000 - 50 p.$$

a. [2 points] Describe the meaning of the slope of this line in the context of this problem.

Solution: For each dollar increase in the cost of the park's admission ticket, 50 fewer people will visit each day.

Furthermore, the park's daily revenue from admission would be given by the quadratic function R(p) = pv, which can be written as

$$R(p) = -50p(p-100)$$

b. [4 points] Sketch a graph of y = R(p) on the axes below. Be sure that the scale of each axis is clear, and **label the** (p, y) coordinates of the vertex and any zeroes.



c. [2 points] What is a reasonable domain for R(p) given the context of the problem? Briefly explain.

Solution: A reasonable domain is [0, 100] since for any other prices, the revenue is negative, which doesn't make sense. It also doesn't make sense to have a negative price.

d. [2 points] What ticket price will maximize the revenue from ticket sales? Briefly explain how you know.

Solution: A ticket price of \$50 will maximize revenue, because this corresponds to the vertex of the parabola, which is at p = 50 since this is halfway between the two zeros of 0 and 100.