

Math 119, Fall, 1999 - Practice Problems/Homework Assignment #17 - Oct 4
Topic: Quadratic Functions (3.1)

Practice Problems that will be worked out in class:

1. For each quadratic function, (1) write it in the standard form if it is not already in; (2) determine if the function f has a maximum value or a minimum value over its domain; and (3) find its maximum or minimum value, and x value at which f reaches its maximum and minimum.
(a) $f(x) = -2(x - 1)^2 - 3$ (b) $f(x) = x^2 - 3x + 1$. (c) $f(x) = -2x^2 + 2x + 1$
2. Find two positive real numbers whose sum is 50 and whose product is a maximum.
3. A rancher has 250 feet of fencing to enclose two adjacent rectangular corrals. Find analytically the dimensions that give the maximum area of the ranch.
4. An indoor physical fitness room consists of a rectangular region with a semicircle on each end. The perimeter of the room is to be a 400-meter running track. Find analytically the dimensions that give the maximum area of the rectangle.
5. The height y in feet of a ball thrown by a child is given by $y = -\frac{1}{6}x^2 + 2x + 5$ where x is the horizontal distance in feet from where the ball is thrown as shown below.
 - (a) How high is the ball when it leaves the child's hand?
 - (b) How high is the ball when it is at its maximum height?
 - (c) How far from the child does the ball strike the ground?

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Homework Assignment #17 - turn it in on Tuesday (Oct. 5):

1. For each quadratic function, (1) write it in the standard form if it is not already in; (2) determine if the function f has a maximum value or a minimum value over its domain; and (3) find its maximum or minimum value, and x value at which f reaches its maximum and minimum.
(a) $f(x) = -2(x - 3)^2 + 1$ (b) $f(x) = 3x^2 + 12x + 2$ (c) $f(x) = -2x^2 + 3x + 1$
2. Find two positive real numbers whose sum is 110 and whose product is a maximum. (Page 265, #57)
3. A rancher has 200 feet of fencing to enclose two adjacent rectangular corrals. Find analytically the dimensions that give the maximum area of the ranch. (Page 265, #63)
4. An indoor physical fitness room consists of a rectangular region with a semicircle on each end. The perimeter of the room is to be a 200-meter running track. Find analytically the dimensions that give the maximum area of the rectangle.
5. The height y in feet of a ball thrown by a child is given by $y = -\frac{1}{12}x^2 + 2x + 4$ where x is the horizontal distance in feet from where the ball is thrown as shown below. (Page 266 - #71)
 - (a) How high is the ball when it leaves the child's hand?
 - (b) How high is the ball when it is at its maximum height?
 - (c) How far from the child does the ball strike the ground?