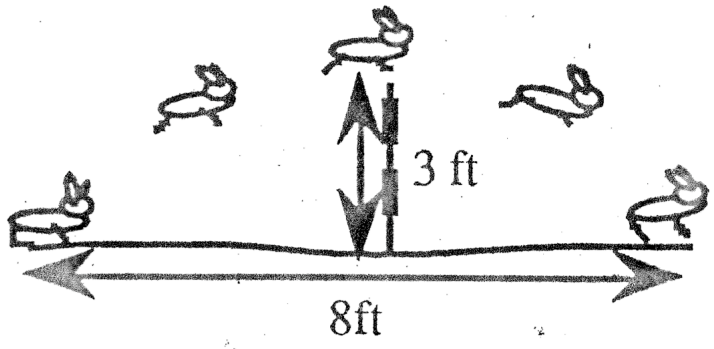
Jackrabbit Problem

The diagram shows a jackrabbit jumping over a three-foot high fence. In order to just clear the fence, the rabbit must start its jump at a point 4 feet from the fence.



(a) Decide were to put the x and y axis on this diagram
(b) Find an equation for a parabola that models the jackrabbit's jump.
(c) Find a way to test your parabola.

FINDING AN EQUATION OF A PARABOLA FROM ITS X-INTERCEPTS AND VERTEX

A parabola with x-intercepts (0,0) and (b,0) can be written in the form **y = ax(x – b).** This is called the "roots form" and the "a" determines the placement of the vertex of the parabola.

If we know the x-intercepts and one other point on the parabola, we can determine the equation!

Given: x-intercepts (0,0) and (4,0), and vertex (2, -6).

Solve for "a" using the equation y = ax(x – 4).
(Substitute the point (2, -6) for x and y.

Show the math steps (on the right) and find the equation of the parabola Described above. Test your equation by graphing.

Try out the process above. Show all steps and check each equation by using a graphing program.

(1) An antelope is jumping over a 9-foot high fence. In order to just clear the fence, the rabbit must start its jump at a point 6 feet from the fence. Write an equation to model the jump of the antelope. Test it out using a graphing program.
(2) Find an equation of a parabola with x-intercepts (0,0) and (10,0). Find the value of "a" so that the vertex is at (5,100).
(3) Find a possible equation of a parabola with x-intercepts (0,0) and (5,0). Is there more than one answer?
(4) Find an equation of a parabola with x-intercepts (-6,0) and (8,0) and vertex at (1,7).
(5) Find an equation of a parabola with x-intercepts (3,0) and (-5,0) and passes through the point (1, -4)