

### Think It Through

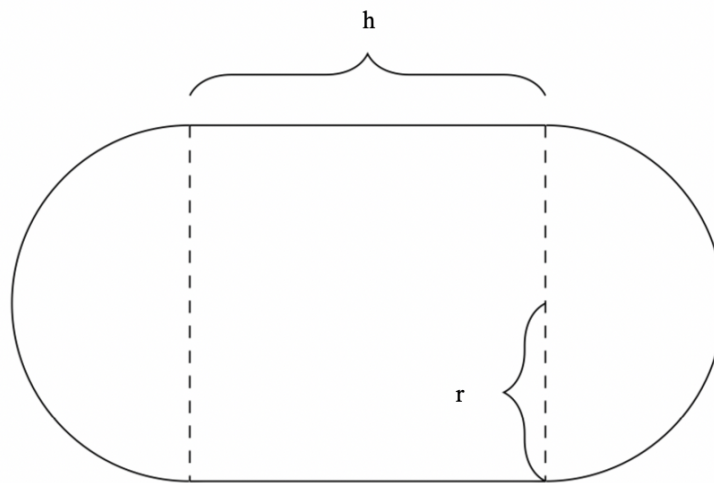
November 30

1. You sketch a parabola with a vertex of  $(-5, 2)$ 
  - (a) Write the equation for the parabola you draw in the form  $y = a(x - p)^2 + q$
  - (b) How many parabolas could you have drawn?
  - (c) Suppose your line must also pass through the point  $(5, -5)$ . What is the equation of your line?
2. You draw a parabola that passes through the points  $(3, 2)$  and  $(-2, -3)$ .
  - (a) Write the equation for the parabola you draw in the form  $ax^2 + bx + c$
  - (b) Write the equation that passes through both points and  $(0, -10)$
3. Does there exist a parabola that passes through  $(-2, 2)$ ,  $(0, 2)$ , and  $(5, 2)$ ?

4. Rancher Nolan wants to build a rectangular pen, using one side of his barn for one side of the pen, and using 100m of fencing for the other three sides. What are the dimensions of the pen built this way that has the largest area?
5. You want to build a pen as shown below in the shape of a rectangle with two interior divisions. If you have 1000m of fencing. What is the greatest area you can enclose?



6. We want to bend a piece of wire into the perimeter of the shape shown below. If you only have 100cm of wire, what values of  $r$  and  $h$  give the largest enclosed area?



7. A professional indoor soccer team has 900 season ticket holders. The management of the team wants to increase the current price of \$400. A survey indicated that for every \$20 increase in price, the team will lose 15 season ticket holders. What price would maximize revenue from season ticket holders? What is the **maximum revenue** the team could receive?