Name:                                          Number:

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## Homework 7

**Instructions:** Please answer the following questions with well thought out answers. You can use this sheet to write your answers or use your own. STAPLE this sheet to the front of the rest of your work. It is important to be able to explain ideas clearly. In this assignment pretend that you are trying to explain to a friend your answers. You should strive for your answers to be: precise, accurate, succinct, and understandable.

**Question 1**  How can we solve a general quadratic equation using the completing the square method?

1. A general quadratic equation is of the form $ax^2 + bx + c = 0$. If we divide both sides by $a$ what equation do we have?

2. Complete the square for $x^2 + \frac{b}{a}x$. Draw a picture to help:
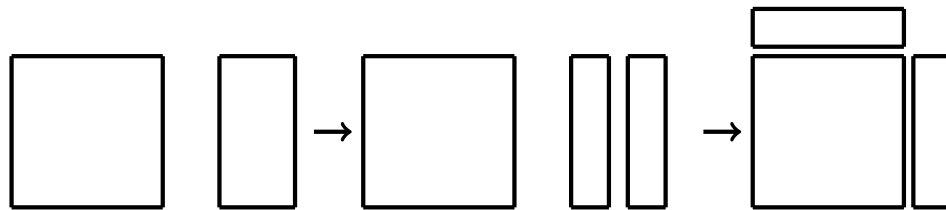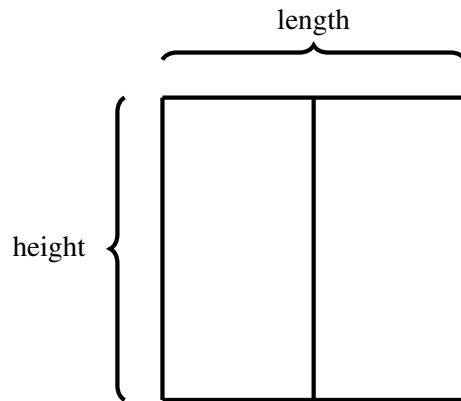


3. Substitute your findings from Part 2 into the equation $x^2 + \frac{b}{a}x + \frac{c}{a} = 0$.

4. Find the sum of $\frac{-b^2}{4a^2} + \frac{c}{a}$.

5. Use Parts 3 and 4 to finish solving the equation $ax^2 + bx + c = 0$.

**Question 2** You are thinking of becoming a farm. Assume you have 100 feet of fencing to build an rectangular animal pen with several sections for different types of animals. A pen with two sections is drawn below.



1. If you divide the pen into 2 sections:

   (a) Make a table having three columns: the height, the length, and the total area.
   (b) Write an algebraic rule that represents the length as a function of height.
   (c) Write an algebraic rule that represents the area as a function of height.
   (d) Graph area as a function of height.
   (e) What choice of height and length will maximize the area of the pen?

2. If you divide the pen into 3 sections:

   (a) Make a table having three columns: the height, the length, and the total area.
   (b) Write an algebraic rule that represents the length as a function of height.
   (c) Write an algebraic rule that represents the area as a function of height.
   (d) Graph area as a function of height.
   (e) What choice of height and length will maximize the area of the pen?

3. If you divide the pen into n sections:

   (a) Make a table having three columns: the height, the length, and the total area.
   (b) Write an algebraic rule that represents the length as a function of height.
   (c) Write an algebraic rule that represents the area as a function of height.
   (d) Graph area as a function of height.
   (e) What choice of height and length will maximize the area of the pen?