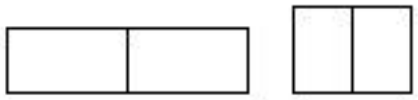
MA-161
Writing Functional Equations

I'll refer to the problems in Ex. 4.7 on pps. 336 - 337. For each question, define carefully the variables (unless I've done so), draw a picture when appropriate, and then do what I've asked you to do. For each problem situation, the functional expression can contain only one variable. That usually means that you have to use all the conditions given in the problem.

Prob. 9) Read the problem. Draw pictures. (The area has to be 1.5 million sq ft in all figures.)



Let x be the length of the three parallel sides and let C the cost of the fence. (Since the unit cost of the fencing material is not given, we'll assume it costs K dollars per foot.) Write C as a function of x.

Prob. 10) Read the problem. Draw pictures. Write the amount of material used as a function of the length of one of the sides of the base. (Since I didn't define the two variables for you, you must do so yourself.)

Prob. 12) Read the problem. Pictures. Write the cost of the materials used to make the box as a function of the width of the base. (That you must define the variables goes without saying -- so from now on I won't say it.)

Prob. 14a) Read the problem. In this problem, you should think of the areas of the rectangles to be a fixed, given number, say K. (This means you're thinking of all rectangles whose area is K square units.) Write the perimeter of such a rectangle as a function of the length of one of its sides. (Your equation will contain the fixed parameter, K.)

b) This time, think of the perimeter of the rectangles to be a fixed number, L. Write the area of such a rectangle as a function of the length of one of its sides.

Prob. 16) Read. Draw the graph of $6x + y = 9$ and locate the point, A, with coordinates $(-3, 1)$. Choose an arbitrary point, T, on the line and call its x-coordinate t. Write the distance between T and A as a function of t. (Remember, your equation has to look like dist = an expression containing t and no other variables. To get such an expression, you'll use the equation of the line.)

Prob. 19) Read the problem. The number r is fixed, just like in Problem 14 above, so you can think of r as being 4, say. On a coordinate system, draw a circle wih center at the origin and radius r. Draw a number of rectangles that are inscribed in the circle. Start with a new picture of the circle. Let (t, 0) be a point on the x-axis between 0 and r. Draw an inscribed rectangle, one of whose sides is perpendicular to the x-axis and contains the point (t, 0). Write the area of the rectangle as a function of t. (Your expression will contain r.)

Prob. 25) Read. Again, r is fixed. Draw pictures. (These are three-dimensional pictures. Draw! And draw some more!) Let x be the radius of one of the cylinders and let V be the volume of the cylinder. Write V as a function of x. (Your expression will contain r.)