



Algebra Made EASY!

Most of us would agree, learning anything is easier when we appreciate the usefulness of what we are studying. Math, for example, can be fun when you solve real problems with a computer.

Make a Box

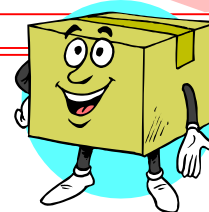
Suppose we had a business and where we sold caramel popcorn and needed boxes to deliver it to local theaters, schools, and retailers in bulk. We don't need a fancy box because the box is thrown away after delivery. The people we sell popcorn to repackage our caramel corn in bags to resell to their customer.

We decide that the ideal volume for our box of caramel corn is between 1.5 and 2.5 square feet. These boxes will be easy to handle, will not take up much space on a shelf, and still provide our customers with a large enough quantity to resell.

A local box supply is not really interested in our business, because we are too small. He wants 50 cents for each box. We talk to a local grocery warehouse, however, and he has sheets of clean cardboard that are used to package food and we can have all we want FREE!

Each sheet is 3' by 3.' To make a box, we merely cut a square out of each corner, fold, and tape the box. Now, we need to figure out how to cut the cardboard to make the biggest box.

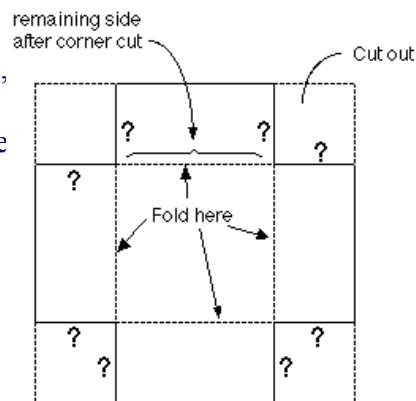
Build a Box



We can make a simple box to deliver our bulk caramel corn by cutting congruent squares out of each corner of a 3 foot by 3 foot piece of cardboard.

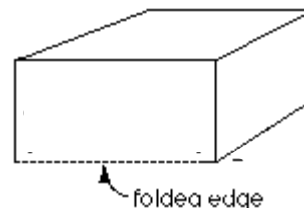
By removing the four corner squares, folding where indicated, and taping up the corner, we will have a suitable container to deliver freshly made caramel corn to our customers.

The question is what size squares should be cut out of the corner to allow us to create a box with maximum volume?



To determine the volume, it might be helpful to imagine what the box will look like after it is folded.

This will be an easy problem to solve with a spreadsheet. It will also illustrate some basic math concepts.



Math Concepts

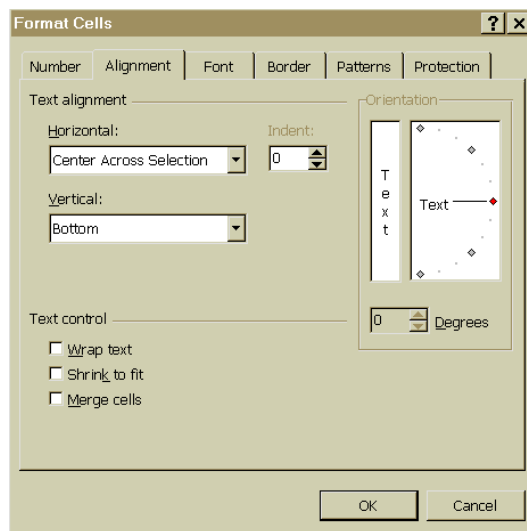
- Volume of a 4 Sided Figure = LWH , where:
 - ✓ L = Length
 - ✓ W = Width
 - ✓ H = Height
- Order of Operations
 - ✓ Multiplication and Division First, from Left to Right
 - ✓ Addition and Subtraction Next, from Left to Right

Spreadsheet Concepts

- Cell Formatting
- AutoFit
- Formulas
- Relative Cell Addresses
- Fill Down and Fill Sequential Features
- Cell Formatting
- MAX function

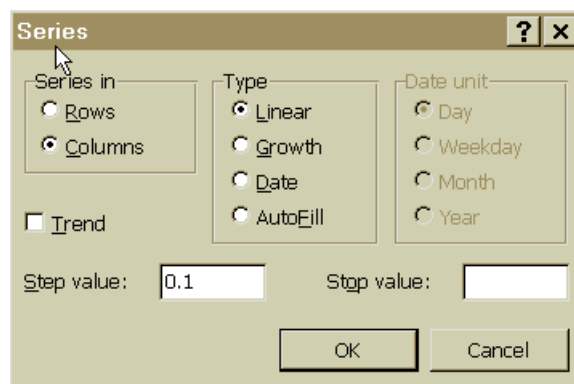
Formatting the Worksheet

1. In cell A1, enter the text: **Build a Box.**
2. In cell A2, enter: **Your Name.**
3. Leave cell A3 blank.
4. In cell A4, enter the text: **Corner Cut.**
5. In cell B4, enter the text: **Side Length Left.**
6. In cell C4, enter the text: **Volume.**
7. Highlight the range A1:C2.
8. Center these headings across the columns you have created by pulling down the **FORMAT** menu, selecting **CELLS** and clicking on the **ALIGNMENT** tab. You should see the screen at the right.
9. Under the **TEXT ALIGNMENT HORIZONTAL** section, click on the pull-down arrow and select **CENTER ACROSS SELECTION.** Click **OK.**
10. Highlight the range A4:C4
11. Pull down the **FORMAT** menu, select Column, and choose **AUTOFIT SELECTION.**



Entering Data

1. In cell A5, enter 0
2. In cell A6, enter .1
3. In cell A7, enter .2
4. Highlight the range A5 to A20
5. Pull down the **EDIT** menu, select **FILL**, and choose **SERIES.** You should see the dialog box on the right.
6. Be sure the same radio buttons are selected and the Step value is 0.1 as indicated. Click **OK**



Formulas

1. The **SIDE LENGTH LEFT** will be calculated with a formula. Because we are working with a 3 foot square piece of cardboard, and a square is being cut off both the left and right sides of the box, the formula for the **SIDE LENGTH LEFT** in row 5 will be $3-2*A5$.
2. Note that because the **ORDER OF OPERATIONS** used in Excel are the same as used in **ALGEBRA**, the multiplication $2*5$ will be calculated first and that results with then be subtracted from 3.
3. In cell B5, enter the formula $=3-2*A5$.
4. Because the cell reference in our formula A5 is a **RELATIVE CELL REFERENCE**, we can copy or fill that formula down and the formula will correctly change the cell address of A5 to the proper cell reference relative to where we fill or copy.
5. Highlight the range B5:B20. Pull down the **EDIT** menu, select **FILL** and choose **DOWN.** The formula will copy down and the cell address will correctly change to A6, A7, A8... as we go down the column and the correct results for each row occupy column B.
6. The **VOLUME** will be calculated with the formula $V=LWH$. Note that we are making a square, so $W=H$.
7. In cell C5, enter the formula $=A2*b2*b2$.
8. Highlight the range C5:C20 and fill down (**EDIT-FILL-DOWN**).
9. Functions are formulas that have been preset in Excel. We will use the **MAX** function to determine what the maximum volume we can make will be.
10. In cell A21, enter the text: **Maximum Volume.**
11. In cell C21, enter the function: $=MAX(C5:C20)$.

AutoFormat

1. Highlight the range A1:C21, pull down the **FORMAT** menu and choose **AUTOFORMAT.** Select the **SIMPLE** format at the top left of the dialog box and click **OK.**
2. **SAVE** and **PRINT** your file.