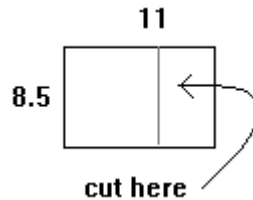


## Trivial Pursuits and Algebraic Models

### Student Material

1. Your group is to cut an 8.5" by 11" sheet of paper to form two pieces, with one piece being twice as long as the other, but both being 8.5 inches wide. Give the length of each piece.



2. Cut an 8.5" by 11" sheet of paper to form two parts, with one sheet being two inches longer than the other. Both parts should be 8.5 inches wide. What are the lengths and widths of the two pieces?
3. Cut an 8.5" by 11" sheet of paper to form three parts, with two parts being of equal length and the third part being one inch longer. All three parts should be 8.5 inches wide. What are the lengths of the three pieces?
4. Play a game with your partner. Each of you opens your book without letting the other person see where. Add together the page numbers of the two pages facing you (the left and right page) and give that total to your partner. **At the same time** your partner is to tell you the total of the pages he or she is seeing. You should each try to determine the pages the other has opened the book to. This is not a race. Both of you should keep working until you both have the pages of the other.
5. Play another game with your partner. Each of you should secretly pick a number between 1 and 100. Multiply your number by 3. Add 21 to the result. Divide the total by 3. Each of you gives your final result to the other. You will each attempt to determine the other's number. This is not a race. Keep working until you both have the other's number.
6. For each of the previous problems, write an equation that represents the solution. In each case, write what the variable in your equation represents.



**Group A problems**  
Student Material

1. Your instructor is going to give your group a string. You are to cut off three pieces so that the shortest piece is 1 inch shorter than the medium piece, the medium piece is 2 inches shorter than the longest piece, and the total length of the three pieces is 16 inches.
2. Cut three more pieces of string. Again, the shortest piece should be 1 inch shorter than the medium piece and the medium piece should be 2 inches shorter than the longest piece, but this time the total length of the three pieces should be 23 inches.
3. *In order to do problem 3, you should first reflect on your work in problems 1 and 2. It will help to ask yourselves: a) In what ways was the work you did to solve problems 1 and 2 the same? b) In what ways was the work you did to solve problems 1 and 2 different?* In a moment, your instructor will give group B a string. They will be asked to cut three pieces off their string so that the shortest piece is 1 inch shorter than the medium piece, and the medium piece is 2 inches shorter than the longest piece. They will also be told what the total length of the three pieces should equal (it will not be 16 or 23 inches). **Write instructions** for group B that tell them how to compute the length of each of the three pieces of string they are to cut. In a moment, they will use your instructions to make these cuts. Your instructions can be in the form of an equation, but make sure you define what each of the variables mean and that you write down how to use this equation. You may also explain why your equation is correct. (When Group B follows your instructions, you will be watching them but you may not assist them. They will tell you what, if anything, is difficult to understand about your instructions, and you will be able to revise them when you do question 5.)
4. Your group is to cut a rectangle out of a sheet of paper. This rectangle should have a perimeter of 28 inches. In addition, the rectangle must be twice as long as it is wide. Use group B's instructions to make this rectangle, even if you think they are wrong. Group B should be watching your group as you work this problem. Tell group B what you didn't understand about their instructions.
5. Rewrite your instructions, using the comments that group B gave you and using your observations about where they had difficulty following your instructions.

**Group B problems**  
Student Material

1. Cut a rectangle out of a sheet of paper. The perimeter of this rectangle must be 12 inches. In addition, the rectangle must be twice as long as it is wide.
2. Cut a rectangle out of a sheet of paper. The perimeter of this rectangle must be 21 inches. In addition, the rectangle must be twice as long as it is wide.
3. *In order to do problem 3, you should first reflect on your work in problems 1 and 2. It will help to ask yourselves: a) In what ways was the work you did to solve problems 1 and 2 the same? b) In what ways was the work you did to solve problems 1 and 2 different?* In a moment, group A will be asked to cut a rectangle out of a sheet of paper. They will be told what the perimeter should be. (It will not be 12 or 21 inches.) **Write instructions** that will tell group A how to find the width and length of the rectangle they are to cut out of the paper, no matter what perimeter they are given. Your instructions can be in the form of an equation, but make sure you define what each of the variables mean and that you write down how to use this equation. You may also explain why your equation is correct.
4. Your instructor is going to give you a piece of string. You are to cut off three pieces so that the shortest piece is 1 inch shorter than the medium piece, the medium piece is 2 inches shorter than the longest piece, and the total length of the three pieces is 31 inches. Use group A's instructions to cut this piece of string, even if you think their instructions are wrong. Group A should be watching your group as you work this problem. Tell group A what you didn't understand about their instructions. (When Group A follows your instructions, you will be watching them but you may not assist them. They will tell you what, if anything, is difficult to understand about your instructions, and you will be able to revise them when you do question 5.)
5. Rewrite your instructions, using the comments that group A gave you and using your observations about where they had difficulty following your instructions.