Graphic Communications
Basic Math and Measurement
Paper Cutting Calculations

Student Name ______________________________ Date ____________________

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Many of the materials including paper used in graphics and printing are very expensive. Sometimes, the paper is the most expensive part of the job. It is important that paper be cut economically and correctly.

Most printing companies buy paper in large sizes because it costs less. They will cut the large sheets down to press size.

Three steps should be followed to make sure that large sheets are cut down in the most economical way. Let’s take an example to show the three steps.

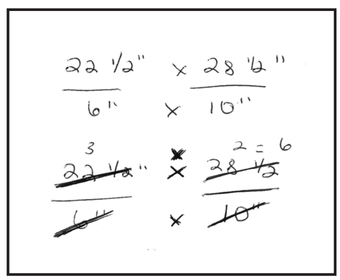
How to Calculate Paper:

A large sheet 22 1/2” x 28 1/2” is to be cut into the maximum number of pieces 6” x 10” that it will yield.

<u>Step #1:</u>

Place large sheet size over size desired.

Divide 22 1/2 by 6 and 28 1/2 by 10.

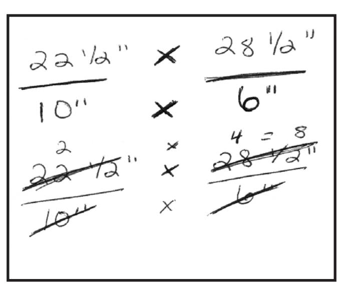


Don’t worry about remainders at this time. Printers call this process “canceling up and down.”

<u>Second Step</u>

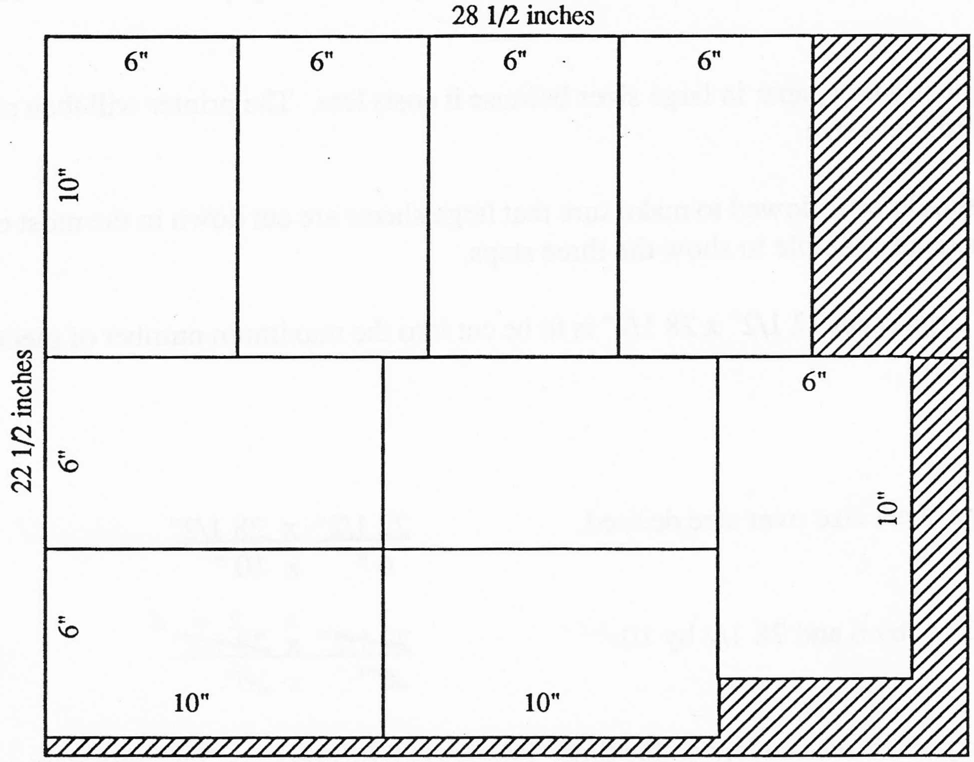
Place large sheet size over size desired but reverse the dimensions of the smaller sheet.

Cancel up and down.



In the first step, we calculate how many sheets of 6” x 10” paper will be yielded if we cut the 6” dimension out of the 22 1/2” dimension, and the 10” dimension out of the 28 1/2” dimension. The answer is six 6” x 10” sheets. The second step shows how many 6” x 10” sheets would be yielded if the 10” dimension were cut from the 22 1/2” dimension and the 6” from the 28 1/2” dimension. The answer is eight 6” x 10” sheets. Obviously, the second approach is more economical.

<u>Third step</u>
Before proceeding to cut, a third step may be necessary to insure that the maximum number of sheets will be yielded. In the first and second steps, if there is a remainder larger than one of the dimensions of the small sheet, it may indicate that more sheets can be yielded from the large sheet.



You can see that if the large sheet is cut in the manner indicated above, nine sheets of 6” x 10” paper will be yielded. If a large number of 22 1/2” x 28 1/2” sheets are to be cut, the extra sheet yielded could reduce waste considerably.

Two additional factors enter into how paper can be cut. First, paper has a grain running through it. If the small sheet is to be folded after printing, the fold will be neater and sharper if the fold goes with the grain of the paper. Also, some cheaper papers feed better in the press when the grain runs lengthwise on the long dimension. Second, the size of the cutter may have a bearing on how paper can be cut. If the cutter blade is shorter than the large dimension of the large sheet, the shorter dimension may have to be cut first. In the example above, a blade shorter than 28 1/2” would necessitate entering the 22 1/2” dimension first and prevent you from achieving a yield of 9 sheets of 6” x 10” paper.

Solve the problems on the next page, assuming that your cutter can accommodate sizes up to 40 inches in length and that the direction of the grain is not a factor. Calculate by using the necessary steps the maximum number of sheets that can be yielded in each case.

1. $\dfrac{17 \times 28 =}{8\ 1/2 \times 14}$

2. $\dfrac{25\ 1/2 \times 30\ 1/2 =}{5 \times 8\ 1/2}$

3. $\dfrac{17 \times 28 =}{9 \times 8\ 1/2}$

4. $\dfrac{25\ 1/2 \times 30\ 1/2 =}{8\ 1/2 \times 10 =}$

5. $\dfrac{23 \times 35 =}{7 \times 9}$

6. $\dfrac{17 \times 22 =}{7\ 1/4 \times 8\ 1/2}$

7. $\dfrac{23 \times 35 =}{8\ 1/2 \times 11}$

8. $\dfrac{17 \times 22 =}{5\ 1/2 \times 8\ 1/2}$

9. $\dfrac{23 \times 35 =}{8\ 1/2 \times 14}$

10. $\dfrac{24 \times 36 =}{12 \times 12}$