# College Bound Math Problem Set #8
week of December 8, 2014

Math is everywhere you look. For example, the first problem here actually occurred in a *real office*. I know, because I was there! Then the second one had to be solved. The problems in #3 are related to the others. Start with #1 and go as far as you can..

1. Ads sent in postal (paper) mail often use thick, slick paper that's fairly expensive, so to save money ABC.org office workers decided to print a mailer-ad multiple times on each sheet and then cut the sheets into pieces so that each piece has 1 copy of the ad. In this case, each original sheet was $8\frac{1}{2} \times 11$ inches and had to be cut into three pieces all the same size, cutting in the shorter direction, as shown. Express as a mixed number the width of each resulting piece.
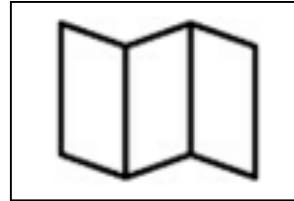
2. The cuts in #1 should be neat and exact, so the office staff used a paper cutter like the one shown. These devices come with a built-in ruler, to help you figure out how to place the paper so the cut is in the right place. However - like most rulers - this one is marked to measure in sixteenths of an inch, not thirds. Given such a ruler, you would have to convert a number like, say, $3\frac{2}{3}$ into a number that is very close to $3\frac{2}{3}$, yet is expressed in sixteenths. Among all fractions of the form $\frac{n}{16}$, where n must be an integer, which one is closest to $\frac{2}{3}$?
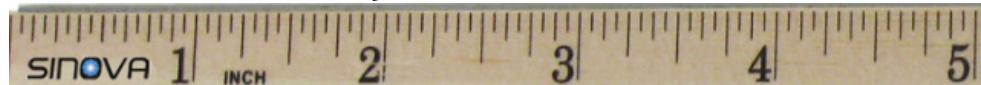
3. Suppose a package of this heavy paper has a label that says it contains 500 sheets weighing a total of 15 pounds.

   (a) After the cutting takes place as described above, can one of the resulting pieces be sent at the postage rate for mail weighing at most one ounce?

   (b) *Optional*: (i) Notice that 4 sheets of $8\frac{1}{2} \times 11$ inches can be made from one sheet that is 17×22 inches (do you see why?) and (ii) read about how the weight of paper is measured at http://www.printoutlet.us/stockweight.php.

   (iii) Now here is the question: Which is heavier, an $8\frac{1}{2} \times 11$ inch sheet of the paper described here that weighs 15 pounds per 500 copies **_or_** an $8\frac{1}{2} \times 11$ inch sheet of 24-pound bond as described at the above website?