RING MOUNTAIN DAY SCHOOL

MS Math February 29, 2008

Dear Ring Mountain Parents,

Our student reference books define area as “the measure, in square units, of the interior region of a two dimensional figure”. As mathematical definitions go, it is fairly clear. Because of the wide variety of figures that we ecounter in two-dimensional space, we have developed a multitude of shortcuts (formulas) that allow us to quickly calculate the number of squares that fit into any given shape.

Taking a trapezoid as an example, we have a four-sided figure (quadrilateral) where two of the sides must be parallel. Go ahead and draw these lines. The only other requirement is that the other two sides are not parallel, otherwise we’d have a ‘rectangle’. Drawing a diagonal line from any corner of the trapezoid to the other reveals that a trapezoid is really just a combination of two triangles that always share the same height. To find the area of a trapezoid you could find the area of each triangle and add them up. As an algebraic formula it looks like this:

$$A = \frac{b_1 h}{2} + \frac{b_2 h}{2} = \frac{(b_1 + b_2)h}{2}$$

Of course, in practice, you could simply add the two bases, multiply this product by the height and then, finally, divide that number in two. That is exactly what the formula is telling you to do in mathematical symbolic notation. Students need to become familiar with the ‘language’ as well as s understand the reasoning behind these shortcuts . Area is a fundamental pillar of mathematics that runs from finding the amount of space in a simple geometric figure in the third grade to the amount of area of a complex function in calculus.

We have also started a fair amount of review wrapped in the mantle of learning new material. For example, our review of the rectangular coordinate system is being done while learning about the mechanics of the polar coordinate system. This allows us to more fully appreciate the structure of the original system. Most students can find the distance between the center of the rectangular system and any point by applying the Pythagorean Theorem. This approach fails when the directions to the point are no longer given in a rectangular fashion. The advanced algebra class will pursue this problem by applying what they already know about trigonometry.

Sincerely,

Thorsten Gritzan
tgritzan@ringmountain.org