Algebra,

Been there – Done that

Slope

Mathematical Systems **Bill Hanlon**

Algebra, Been there –Done that is a newsletter that links algebra to previously learned concepts and skills or outside experiences

The idea of slope is used quite often in our lives, however outside of school, it goes by different names. People involved in home construction might talk about the pitch of a roof. If you were riding in your car, you might have seen a sign on the road indicating a grade of 6% up or down a hill. Both of those cases refer to what we call slope in mathematics.

Kids use slope on a regular basis without realizing it. Let's look at an example, a student buys a cold drink for \$0.50, if two cold drinks were purchased, the student would have to pay \$1.00.

I could describe that mathematically by using ordered pairs; (1, \$0.50), (2,\$1.00), (3,\$1.50), and so on. The first element in the ordered pair represents the number of cold drinks, the second number represents the cost of those drinks. Easy enough, don't you think?

Slope is defined as the *rate of change*

Now if I asked the student, how much more was charged for each additional cold drink, hopefully the student would answer \$0.50. So the difference in cost from one cold drink to adding another is \$0.50. The cost would change by \$0.50 for each additional cold drink. The change in price for each additional cold drink is \$0.50. Another way to say that is the *rate of change* is \$.50. In math, we call the rate of change—slope.

$$m = \frac{rise}{run}$$

In math, the rate of change is called the slope and is often described by the ratio $\frac{rise}{run}$.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

The rise represents the change (difference) in the vertical values (the y's), the run represents the change in the horizontal values, (the x's). Mathematically, we write

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Let's look at any two of those ordered pairs from buying cold drinks, (1,\$0.50) and (3,\$1.50) and find the slope. Substituting in the formula, we have:

$$m = \frac{1.50 - 0.50}{3 - 1} \rightarrow \frac{1.00}{2}$$

Simplifying, we find the slope is \$0.50. The rate of change per drink is \$0.50

EXAMPLE Find the slope of the line that connects the ordered pairs (3,5) and (7, 12)

Subtract the y values and place that result over the difference in the x values.

$$\frac{12 - 5}{7 - 3} = \frac{7}{4}$$ The slope is 7/4

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