

Fast and Friendly Functions

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Our goal was to provide teachers with another way of helping their students understand how to write a rule from a picture, a table or a graph. As classroom educators, we know that this is an area that students struggle with; we have found success in our classrooms and wanted to share this with others.

First, we had the participants work on a towers activity, using a picture of four towers, built with two, four, six, and eight blocks. Participants were asked to write a rule that explains how to compute the number of blocks in any tower, based on the pattern in the picture. We incorporated the slope-intercept equation, in the form of “ $y = \text{change}(x) + \text{begin}$,” where y represents the number of blocks in a given tower, x represents the tower number (1 for the first tower, 2 for the second, and so on), “change” represents the action in the given rule (multiplying times 2 in this example), and “begin” represents the starting point of the pattern (0, or no blocks, in this example). We also talked how it may make more sense for students to think of the equation as “ $y = \text{begin} + \text{change}(x)$.”

We asked the participants how their students would find the intercept. From there we graphed the picture on the calculators using the given values for x and y , and then we graphed the rule of the function. We also presented this activity using different patterns of towers, which began with different numbers of blocks (including one with a negative number) and increasing or decreasing the height of the towers by different amounts.

Next we moved on to examining story situations that participants could use with their students. In one, a person begins with a given number of dollars and then saves the same amount each week. In another, students compare the cost of buying a membership at a video store and paying smaller rental fees versus paying the full fee for rentals but no membership fee. Each problem included several questions to be answered about the scenario, such as “at what point is it better to NOT purchase a membership?” (i.e. one can rent up to how many movies before it becomes more cost effective to purchase a membership?) and “what does the point of intersection of the two lines on the graph mean?”

Three more tasks were also presented. In these, students compare the costs of downloading music from two different sites, one with and one without a membership fee; compare the costs of bowling at two different bowling alleys with different rates for renting shoes and playing games; or compare renting movies from a Blockbuster store or online from Netflix. Throughout the session, participants were engaged in actually doing the graphs, writing rules and using the TI-73 calculator to help with this process. These activities were adapted from a presentation by Charlene Larsen and Jane Martin entitled “Math Matters to Kids: Movies, Bowling, and iPod Devices Using the TI Graphing Calculators,” given at a Texas Instruments T³ International Conference.