

**A fun GCD activity:**

Imagine a pool table with pockets in the four corners. Represent it as a rectangle drawn on graph paper. Start with a ball at the bottom left corner, moving up at a  $45^\circ$  angle. The ball bounces off each side of the rectangle, until finally it reaches one of the corners and falls in the pocket.

For example, draw a 5 by 10 pool table (width 5, height 10). The ball moves up and to the right, hits the middle of the right side of the table, moves up and to the left, and falls into the top left pocket.

- a) How many times does the ball bounce on a 6 by 10 table? Which pocket does it land in?
- b) Draw tables of various sizes and make a chart listing the dimensions of the table, how many times the ball bounces in total, how many of those bounces are on the left/right sides, how many are on the top/bottom sides, and which pocket the ball lands in. Make sure to include at least the 1 by 3, 1 by 4, 1 by 6, 3 by 5, 6 by 10, 9 by 15, 1 by 12, 2 by 12, 3 by 12, 4 by 12, 5 by 12, and 6 by 12 in your list, and as many others as you have time for. [This is one of the first activities I use for teaching special cases and organization.]
- c) Think about greatest common factor (and about writing and simplifying fractions). Your drawings should help you understand why some of the rows in the table give the same answers.
- d) Using the tables you have drawn, can you predict which corner the ball will end in on a 79 by 103 table? 79 by 102? 78 by 102? Explain how you made your prediction. Can you prove your answer?
- e) On each of those tables, predict how many top/bottom bounces and how many left/right bounces the ball will have. Again, explain how you made your prediction, and then work on proving your answer.

	Total	left/right	top/bottom	Pocket
1 by 3				
1 by 4				
1 by 6				
3 by 5				
6 by 10				
9 by 15				
1 by 12				
2 by 12				
3 by 12				
4 by 12				
5 by 12				
6 by 12				