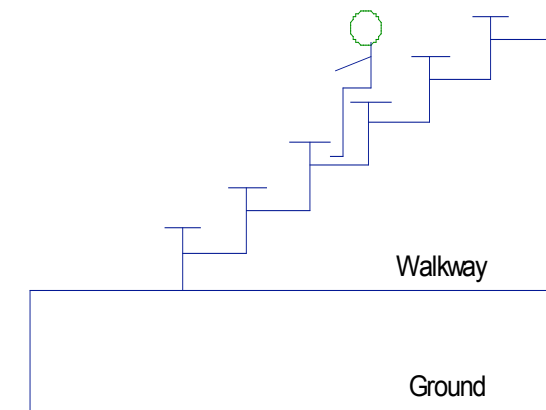


Stadium Seating Problem

Adapted by Rebecca McGraw (from a problem created by David Romero, Rebecca McGraw and Robert Krueger)¹

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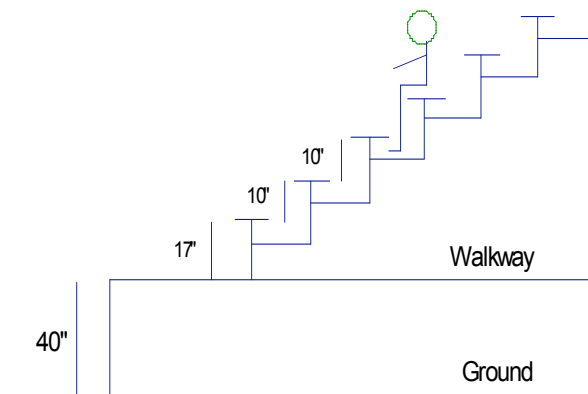
Problem Setup: Show students pictures of stadium bleachers (taken from a nearby school stadium), followed by the following diagram. Have students discuss in groups and then as a whole class the questions – what is being asked and what information would you want to be given in order to solve the problem. This ensures that everyone understands the problem is ready to begin working on it.



How high above the ground would you be if you were sitting in the 5th row? The 10th row? The 50th row?

Find a method that will allow you to determine how high you are above the ground for any row.

Next, give students the diagram with numbers (below) and ask them to work in small groups to solve the problem. Allow for symbolic and non-symbolic methods; the importance at this point is the reasoning that students develop as they work on the problem.



Have students prepare posters or other methods for sharing their reasoning (not just their answers). As students explain their reasoning, represent their ways of thinking symbolically on the board (see examples below).

$$57+10x-10$$

“because x is any number of seats you want to know and 57 is the ground to the seat and the first seat measurement and the minus 10 is because the first seat doesn’t count because it had its own measurement.”

$$57+10(x-1)$$

“First, we had to find the distance from the ground to the first seat, which was 57, then we added 10 for every row until we got to the number we needed to get to” “for example, for the fifth row, $57+10+10+10+10$ ”

$$40+10x+7$$

“Our method is to add 40 from the ground through the walkway. Then we add 10 for each seat . . . but you add 7 more inches because you also need to count from the . . . stair and through the seat”

Follow up the discussion by asking students to discuss in small groups the solution of another group and/or ask students to individually write an explanation of the reasoning of another group.

Finally, challenge students to explain how a student is thinking who comes up with the following method for finding the height:

$$y = 40+17x-7(x-1)$$

x =row number

y =height above the ground