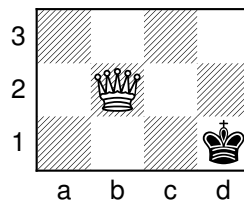

Problem of the Week

Number Three

September 16, 2013

In addition to his more conventional mathematical brainteasers, Sam Loyd was also famous for his imaginative chess problems. Sadly, not everyone plays chess (a fact I find incomprehensible, but what can you do?) That acknowledged, the following teaser is very much in Loyd's style and requires almost no knowledge of how to play chess. **The problem is to determine how the white queen can force the black king to move to the square d3, in no more than four moves.** (Note that, for the purposes of this problem, the chessboard has dimensions 4×3 . You are seeing the entire board.)



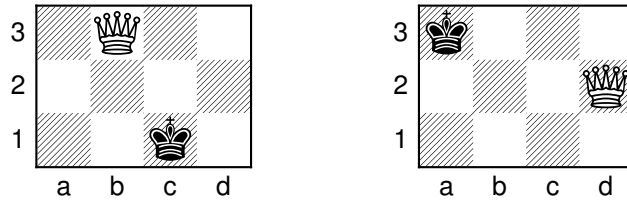
Here is all you need to know about chess to approach this problem:

1. The white piece is a queen, and she can move any number of squares she wants on any straight line path: horizontal, vertical or diagonal.
2. The black piece is a king, and he moves one square at a time in any direction: horizontal, vertical or diagonal.
3. At no point is the black king permitted to move to a square accessible to the white queen. If the white queen moves to a square from which she can "see" the black king, then on his next move the king must move to a safe square.

Of course, the players take turns with white moving first. And that's it!

To write down your solution, each move should be indicated by writing Q or K, followed by the square to which the piece is moving. If at any point the Queen can "see" the king, indicate that with a "+" sign. Finally each pair of moves should be given its own number. (Flip page!)

For example, if white begins by moving his queen one square up, and black replies by moving his king one square left, then we would write: 1. Qb3+ Kc1, and we would reach the diagram on the left below. After the subsequent moves 2. Qd3 Kb2 3. Qd2+ Ka3, we reach the position on the right:



Of course, both players had other options for each of their moves.

Solutions are due to Jason Rosenhouse by 5:00 on Friday, September 20. Please write your solution clearly somewhere on an official POTW problem sheet. Place your name, e-mail address, and the section numbers and professors of any math courses you are taking, in the upper right corner of the page. Papers may be handed to him directly, placed in the inbox outside his office, or left in his mailbox in the main office. One weekly winner will receive a five-dollar gift card from Starbucks. Winners will be drawn randomly from among the correct answers. All problems, and eventually their solutions, will be posted at

<http://educ.jmu.edu/~rosenhjd/POTW/Fall13/homepage.html>