

**SCHOLARSHIP DAY, 2014:  
MATHEMATICAL ENTERTAINMENTS**

A HIDDEN PRIZE

There are three boxes, exactly one of which contains a prize. Each box has a label with a visible statement on it, and exactly one of the statements is true.

- Gold box label: “The prize is in this box.”
- Silver box label: “The prize is not in this box.”
- Lead box label: “The prize is not in the gold box.”

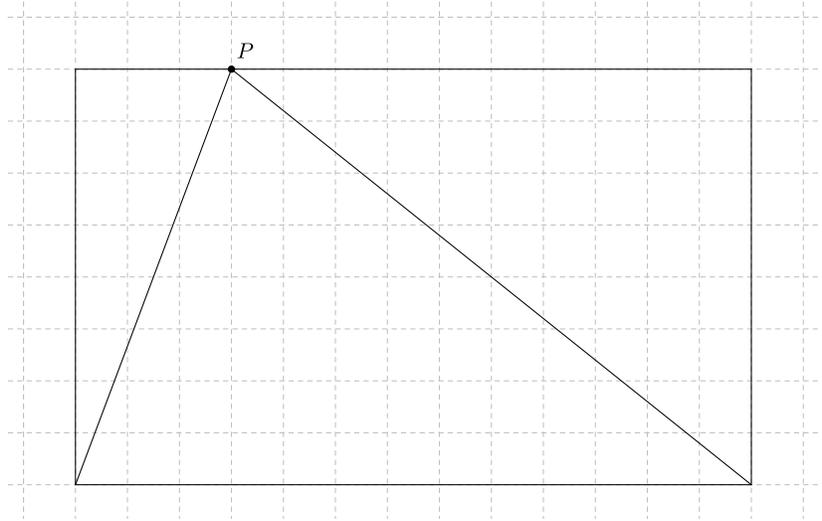
Which box contains the prize?

## BASKETBALL TOURNAMENT

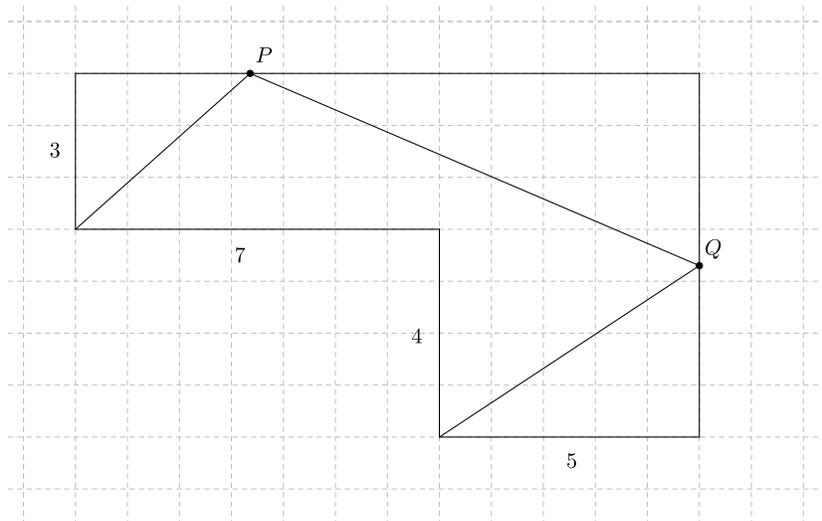
A basketball league holds its annual “September Sanity” tournament every December. A total of 72 teams are invited and each is placed in one of 4 regional brackets. The Northeast bracket has 20 teams. The Southeast and Northwest brackets each have 18 teams. The Southwest bracket has exactly 16 teams. When a bracket has more than 16 teams the lowest ranking teams are paired off in a preliminary one-game play-off round to reduce the number of teams to exactly 16. For example, in the Northeast bracket the lowest ranking 8 teams are paired off to eliminate 4 of them, leaving 16. After the preliminary round teams play each other in pairs according to their rankings and only advance when they win, leaving 1 regional champion from each bracket. The 4 regional champions then meet in the National Finals, where again the teams are paired — Northeast vs Southeast and Northwest vs Southwest — with the 2 winners advancing to the Championship Game and the 2 losers playing one another in the Consolation Game. How many basketball games are played all together in this tournament?

SHORTEST PATH

The task here is to find the shortest path the starts in the lower left corner of a rectangle, crosses to the top edge, then crosses back to finish at the lower right corner.



Here's a similar problem, but a wee bit more complicated. What is the shortest path in this case?



## WHICH IS BIGGER?

- Which is bigger,  $e^2$  or  $2^e$ ?
- Which is bigger,  $e^\pi$  or  $\pi^e$ ?
- Which is bigger,  $n!$  or  $1000^n$ ?