

## How Do We Do That?

**Problem 1.** There are two egg timers: one for 7 minutes and one for 11 minutes. How can we use these timers to measure exactly 15 minutes?

**Problem 2.** There are just two buttons in an elevator for a building with twenty floors. The elevator goes up 13 floors when the first button is pushed, and goes 8 floors down when the second button is pushed (the elevator will not move if there are not enough floors to go up or down). How can we get from the 13th to the 8th floor?

**Problem 3.** Draw a path made from connecting four line segments at their ends that passes through all 9 points shown in figure 1 below.

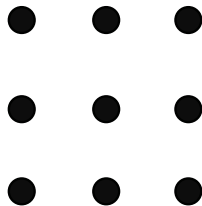


Figure 1:

**Problem 4.** Cut a  $3 \times 9$  rectangle, like the one below, into 8 squares.

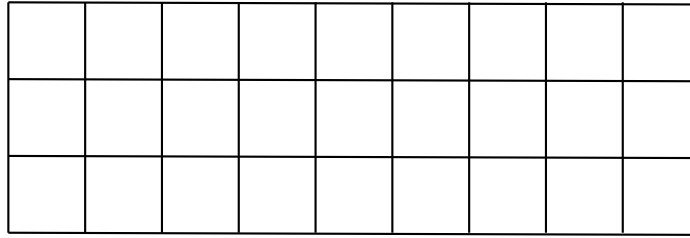


Figure 2:  $3 \times 9$  rectangle.

**Problem 5.** Find a two digit number, the sum of whose digits does not change when multiplied by a one digit number.

**Problem 6.** Make a magic square with the digits: 1, 2, 3, 4, 5, 6, 7, 8, and 9; that is, place those digits in the boxes of a  $3 \times 3$  table so that all the sums of the numbers along the rows, columns, and diagonals are the equal.

**Problem 7.** Place a number of pennies flat on a table so that each coin touches exactly three others. This can be done with fewer than 20 pennies.