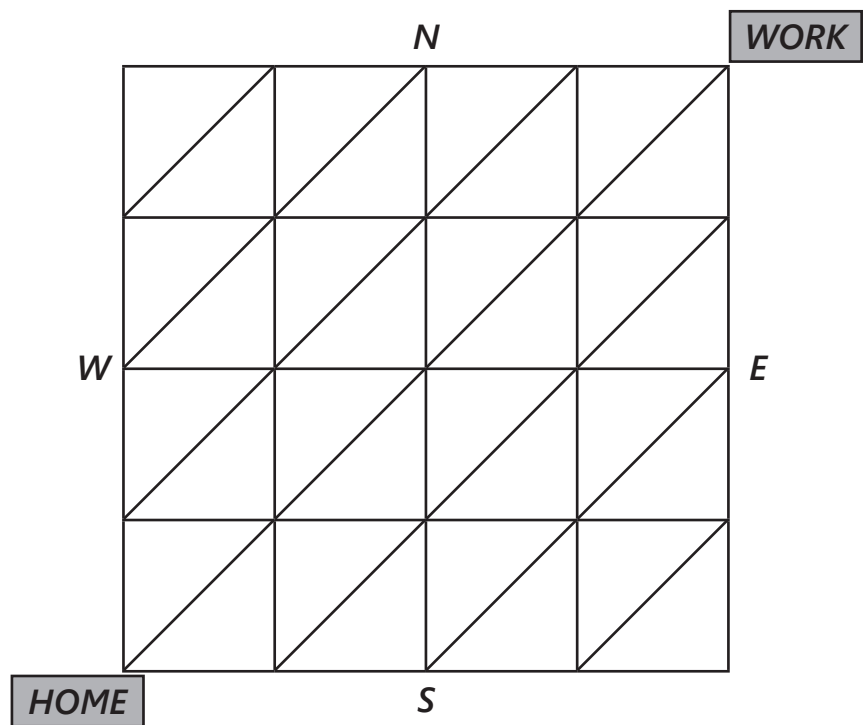


Walking to Work

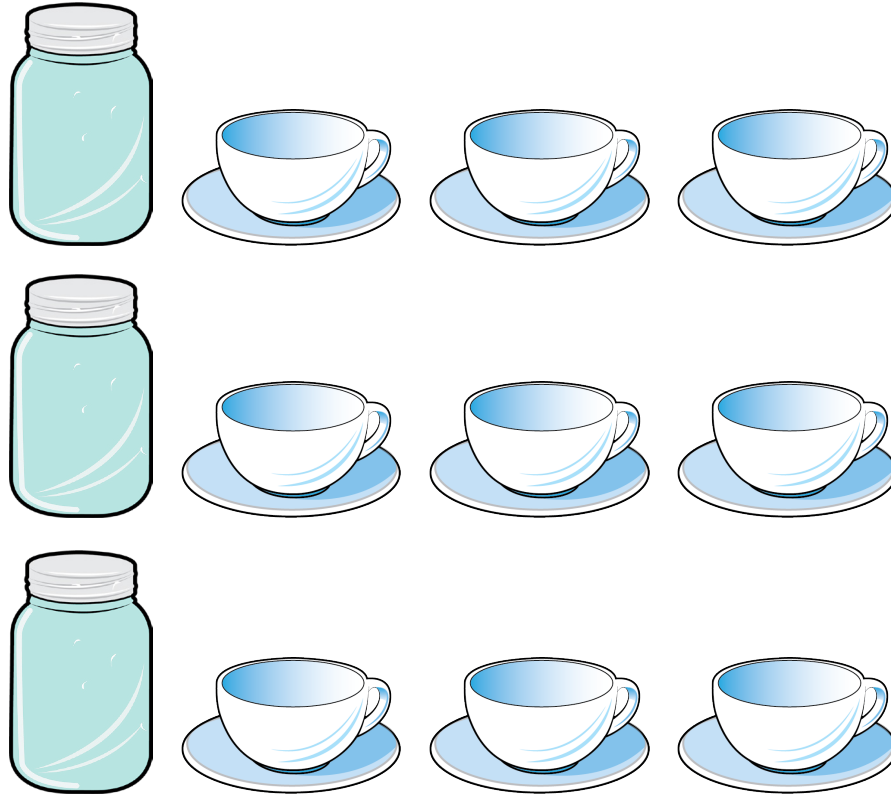
A man living in the house shown in the diagram wants to figure out if he can walk to work a different way every day.



He does not go to work on the weekend and has 4 weeks' holiday.

Counters in Cups

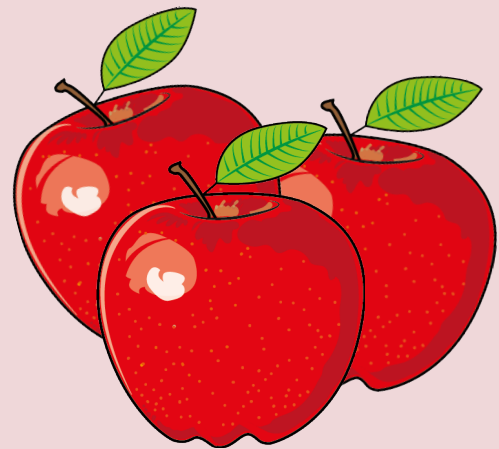
The three jars each contain the same number of counters. If we transfer to each cup one-eighteenth of the number of counters that each jar contains, we then find that each jar holds more counters than each of the cups. How many counters are there in each jar before they are removed?



The Orchard

A fruit grower was planting a new orchard. The young trees were arranged in rows so as to form a square, and it was found that there were 146 trees unplanted. To enlarge the square by an extra row each way he had to buy 31 additional trees.

How many trees were there in the orchard when it was finished?



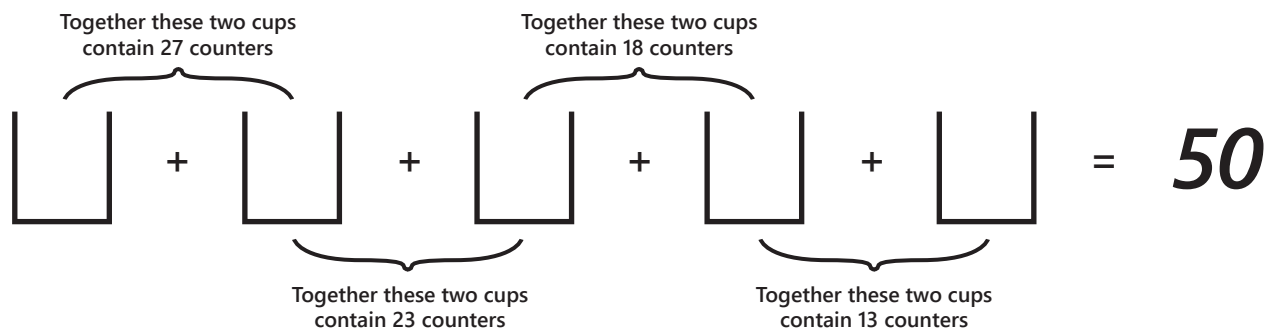
Mixed Up Marbles

Three cans are known to contain two marbles each, which are either black-white, black-black or white-white. Each can has a label on it with one of these designations. All labels are also known to be incorrect with respect to the cans' contents. Drawing marbles without replacement, what is the least number of draws required to determine the contents of all three cans?



Counters in Cups 2

There are 50 counters in the five cups below. How many counters are in each cup?



The Three Jars

Jose put 27 counters in three jars so that:

- the middle jar has one more counter than the left cup.
- the right jar has two more counters than the left cup.



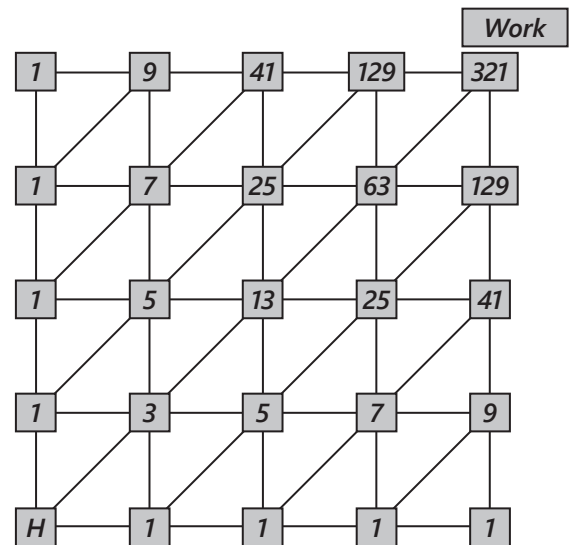
How many counters are in each jar?

Answers

Going to Work

Starting from the house, H, there is only one way of getting to each of the points in a northerly direction, and also going direct east.

Now take the second column, and you will find there are three ways of going to the second point from the bottom. Then the central point can be reached in 13 ways, because we can enter it either from the point below that can be reached in five ways, the point to the left (also five ways) or the point diagonally across (three ways). Each point is the sum of the three numbers from which it can be reached. Thus the total number of routes is 321.



Counters in Cups

The number in each jar was originally 36 counters, and after each cup had received $2\left(\frac{1}{18}\right)$ every cup would then hold 6, and every jar 18 - a difference of 12.

The Orchard

At first he had 7890 trees which formed a square 88×88 , and left 146 trees over; but the additional 31 trees made it possible to plant a square 89×89 , or a total of 7 921 trees.

Mixed Up Marbles

Draw one marble from the can labelled BW. If it is W then the other marble is also W. Therefore, the can labelled BB can only be BB or BW, but BB is ruled out. This leaves BB for the can labelled WW. Similar reasoning can be used if the marble drawn from the BW can is B.

Counters in Cups 2

In the first four cups there are $27 + 18 = 45$ counters. So the fifth cup must contain 5 counters, thus the fourth box must contain 8 counters, thus the third box must contain 10 counters, thus the second box must contain 13 counters, thus the first box must contain 14 counters.

The Three Jars

8, 9, 10 counters.

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