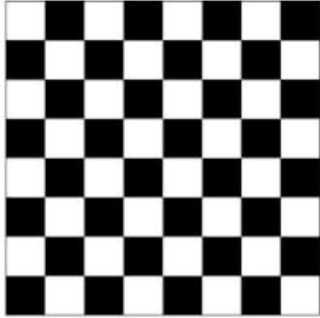


**Problem Solving Activities Section 1.1**

1. A chessboard is pictured below. How many squares of any size are on the chessboard?



2. A farmer raises chickens and cows. Assuming all the animals are anatomically correct and that there are a total of 40 heads and 114 legs, how many chickens and cows does the farmer have?

3. A standard  $8 \times 8$  chessboard can easily be covered (tiled) with non-overlapping dominoes ( $1 \times 2$  pieces): simply use 4 dominoes in each row. But what if we remove two squares—one each from diagonally opposite corners of the chessboard? Can this modified chessboard be completely covered by non overlapping dominoes? (Recall that you have an image of a chessboard on the front of this page if you'd like to look at that for reference.)



4. This may not seem mathematical and may not seem to be something you can determine without looking it up or having specific previous knowledge, but see if you can find a way to independently determine this. The Hawaiian language is said to be very musical, probably because its alphabet contains only 12 letters. Can you list them all?

5. It is possible to use each of the digits 1 through 9 to fill in the squares of the  $3 \times 3$  grid below so that the sum of the numbers in each row, column and diagonal is the same. Find a solution (many are possible!) and then try this on a separate page of paper for a  $4 \times 4$  grid and a  $5 \times 5$  grid. Can you use your knowledge gained from solving the  $3 \times 3$  to help you solve the larger grids? Why or why not?

