

Homework 1 Solutions

Problems

1. Prince Charles, the eldest son of Queen Elizabeth II, is 1st in line to the throne of England. Heinrich von Pezold is 1733th in line to the throne. How many people would Heinrich have to bump off to become 1st in line to the throne?

He would have to bump off the 1st in line to the 1732rd, and the number of numbers between 1 and 1732 inclusive is 1732 .

2. How many numbers are there between 1437 and 1784, inclusive?

We use our formula $1784 - 1437 + 1 = 348$

3. How many numbers are there between 64 and 150, inclusive? How many of them are even? How many are odd?

$$150 - 64 + 1 = 87$$

For the second part of the question we observe that the even numbers between 65 and 150 are in one-to-one correspondence with those numbers between 32 and 75, and there are $75 - 32 + 1 = 44$ even numbers in the range specified. Then, since every number is either odd or even, we see there are $87 - 44 = 43$ odd numbers.

4. How many four-digit numbers (that is, numbers between 1000 and 9999, inclusive) are divisible by 6? How many are divisible by 11? (*Hint:* You'll need to figure out the highest and lowest such number.)

The highest and lowest numbers in that range which are divisible by 6 are 1002 and 9996. Dividing by 6, we see that the multiples of 6 between 1002 and 9996 are in one-to-one correspondence with those numbers between 167 and 1666, of which there are $1666 - 167 + 1 = 1500$

The highest and lowest numbers in that range which are divisible by 11 are 1001 and 9999. Dividing by 11, we see that the multiples of 11 between 1001 and 9999 are in one-to-one correspondence with those numbers between 91 and 909, of which there are $909 - 91 + 1 = 819$.