Homework 1 Solutions

Problems

1. **How many numbers are there between 291 and 503, inclusive?**

   The number of numbers between k and n, inclusive, is $n - k + 1$. In this case, the formula gives $503 - 291 + 1 = \boxed{213}$.

2. **How many numbers are there between 61 and 194, inclusive? How many of them are even? How many are odd?**

   Again applying the formula, there are $194 - 61 + 1 = \boxed{134}$ numbers in this range.

   For the second part, we must count the numbers in the list $62, 64, 66, \ldots, 192, 194$. Dividing each number by 2 gives a new list of the same length: $31, 32, 33, \ldots, 96, 97$. But now these numbers are consecutive, so our formula applies, and the length of this list is $97 - 31 + 1 = \boxed{67}$.

   Every number is either even or odd, so the number of odd numbers in this range is the total number (134) minus the number of evens (67), or $\boxed{67}$.

3. **How many three-digit numbers (that is, numbers between 100 and 999, inclusive) are divisible by 7? How many are divisible by 17?**

   The smallest 3-digit number divisible by 7 is 105, and the largest is 994. So, we need to find the length of the list $105, 112, \ldots, 994$. Dividing each number by 7 gives the list $15, 16, \ldots, 142$, which has length $142 - 15 + 1 = \boxed{128}$.

   Similarly, the smallest 3-digit number divisible by 17 is 102, and the largest is 986. So, we need to find the length of the list $102, 119, \ldots, 986$. Dividing each number by 17 gives the list $6, 7, \ldots, 58$, which has length $58 - 6 + 1 = \boxed{53}$.