1.       Use MAPLE or any other technique to find how many prime numbers are there in the following ranges:

i)         [1, 1000]

ii)       [1000, 2000]

iii)       [2000, 3000]

iv)      [10000, 11000]

v)        [100000, 101000]

Describe any patterns you see

2.        Try to implement as many of the rules in the table in Section 2 (copied below) as you can in your chosen programming language

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| --- | --- | --- |
| k | Rule | Example |
| 2 | If the final digit of n is even then n is divisible by 2 |  |
| 3 | If the sum of the digits of n is divisible by 3 then so is n. Repeat if n is very large. | n = 96345 has digit sum 9 + 6 + 3 + 4 + 5 = 27 which is divisible by 3 |
| 4 | If the number formed of the last two digits is divisible by 4 then so is n | n = 46348 is divisible by 4 because        48 = 12 \* 4 |
| 5 | If the final digit of n is 0 or 5 then n is divisible by 5 |  |
| 6 | If the final digit of n is even and the digit sum is divisible by 3 then n is divisible by 6 |  |
| 7 | Remove the last digit of n, double it and subtract the result from the remaining number. If this is divisible by 7 then so is n | n = 7854 gives 785–(2x4) = 777 = 111 \* 7 so 7854 is divisible by 7 |
| 8 | If the number formed of the last three digits is divisible by 8 then so is n |  |
| 9 | If the sum of the digits of n is divisible by 9 then so is n. Repeat if n is very large. |  |
| 10 | If the final digit of n is 0 then n is divisible by 10 |  |

3. What rules can you find for numbers bigger than 10 - give the rule and at least one example