1. (a)

   In the command window, we use
   >> y = floor(log10(x))
   Of course, you need to assign a positive value to x first

   (b) It will say
   Unrecognized function or variable 'Dogs'.
   Because MATLAB is case-sensitive. The variable “Dogs” is different from “dogs” and is not defined.

   (c) The following command
   >> pow2(2, 4, 5)
   will result in
   Error using pow2
   Too many input arguments.
   The pow2 function takes two arguments but we give three.

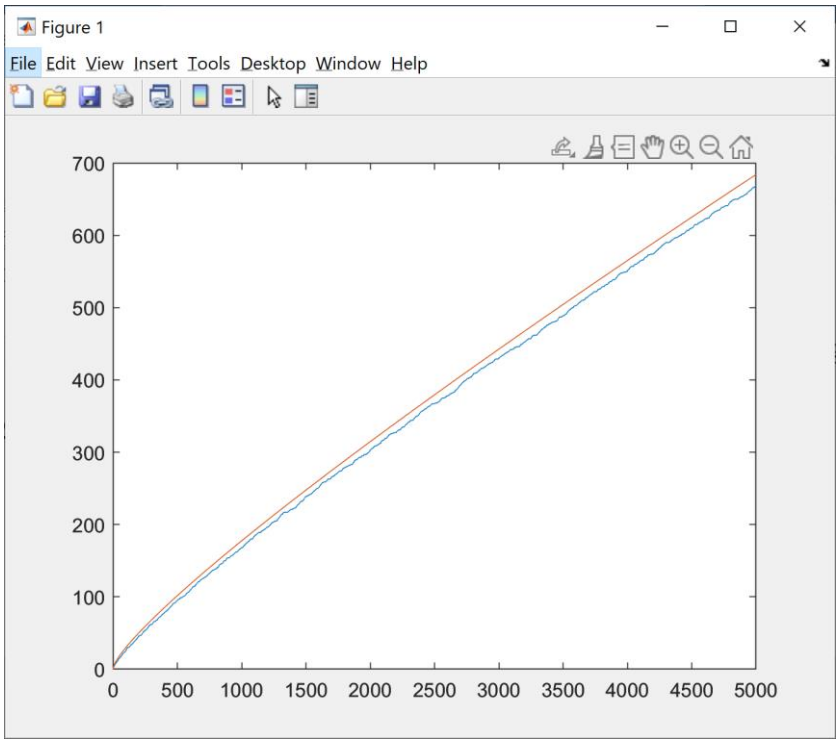
   (d) We use the following commands to loop variable A and B through 1 to 9 and add up their quotient A/B to the total, which is defined to be 0 at the very beginning.

```
>> total = 0;
>> for A = 1:9
for B = 1:9
total = total + A/B;
end
end
>> total

total =

  127.3036
```

2. (a) The error message is
   Array indices must be positive integers or logical values.
   Because in the for loop, when mmm=1, we have the terms C(0), L(0) which has zero index.
   To fix that, change
   C(mmm)=C(mmm-1)+isprime(mmm);
   L(mmm)=L(mmm-1)+1/log(mmm);
   into
   C(mmm+1)=C(mmm)+isprime(mmm+1);
   L(mmm+1)=L(mmm)+1/log(mmm+1);
   Or equivalently, one may change mmm=2:5000 in the loop index.

   (b) The C(n) counts the number of prime numbers before n, while L(n) is adding up the reciprocal of log of all integers before n.
   I don’t know what you have not seen in the class, since I am not in your classroom.

(c) The resulting figure is

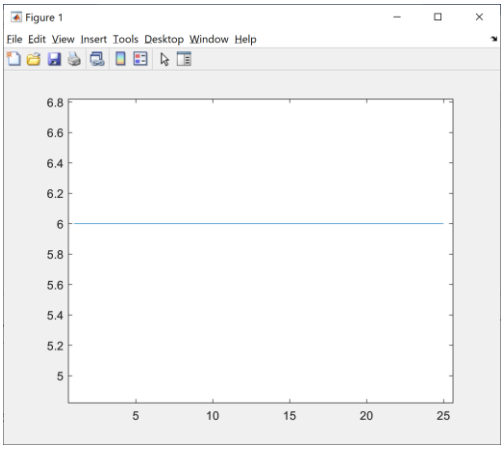


(d) We notice the two curves stay very close, it means that we may use the sum of reciprocal of log of integers to approximate the amount of prime numbers.

3. (a) We have the following commands

```
>> x(1)=6;
>> for step = 2:25
x(step) = 0.25*(12+2*x(step-1));
end
>> plot(x)
```

and the resulting plot

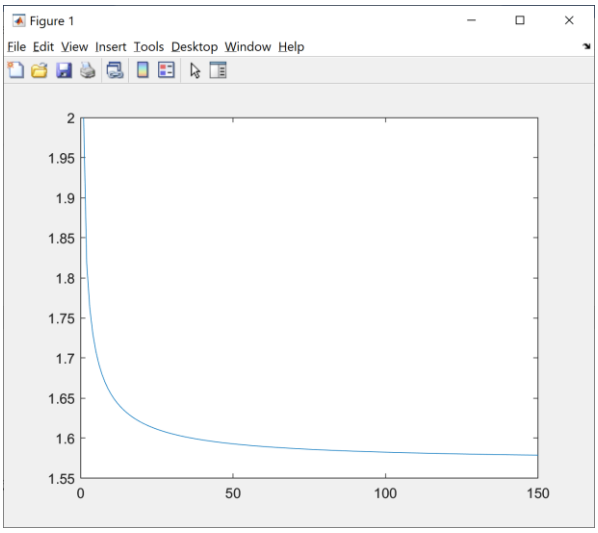


which shows that $x = 6$ is a fixed point.

(b) We have the following commands

```
>> x(1)=2;
>> for step = 2:150
x(step) = x(step-1)*sin(x(step-1));
end
>> plot(x)
```

and the resulting plot



The sequence will converge to a fixed point $x = \pi/2$ as the curve is flattened as n increases. On the other hand, solving

$$x = x \sin x$$

will also give $x = \pi/2$ as a solution.

(c) We have

```
>> x(1)=-1;
>> x(2)=1;
>> for step = 3:15
x(step)=x(step-1)+x(step-2);
end
>> x(8)


ans =
```

5

```
>> plot(x)
```

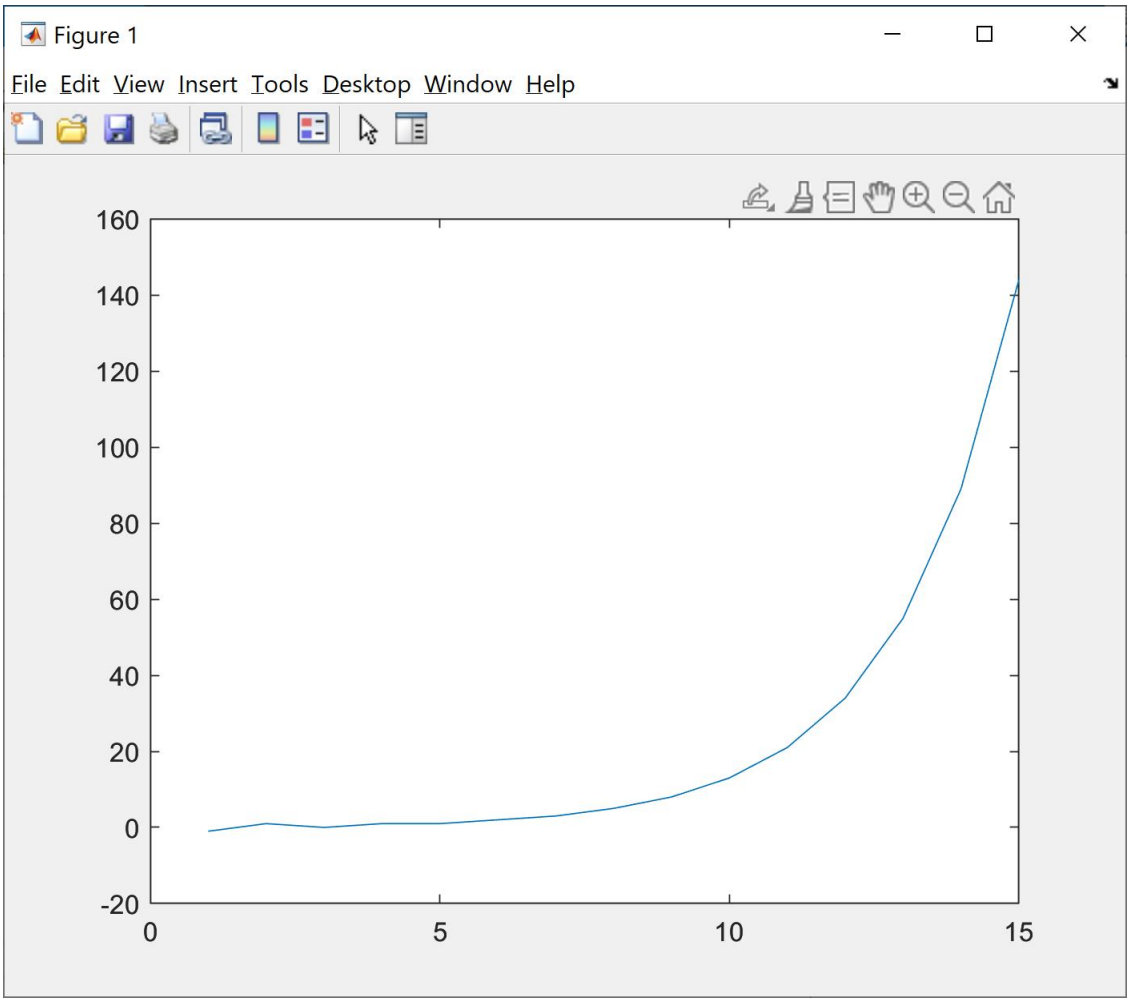


Figure 1
File Edit View Insert Tools Desktop Window Help
160
140
120
100
80
60
40
20
0
-20
0
5
10
15