```
% MIDTERM Assignment 9 Q1

x = input('Input factorial: ');
value = x;
while x > 1
  x1 = x - 1;
  value = value * x1
  x = x1;
  display('------')
end

disp('Total: '), disp(value)
```

Output

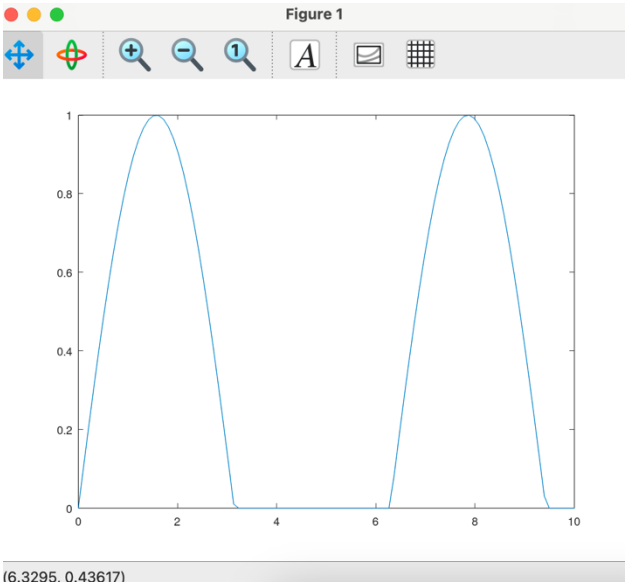
```
Input factorial: 12
value = 132
------
value = 1320
------
value = 11880
------
value = 95040
------
value = 665280
------
value = 3991680
------
value = 1.9958e+07
------
value = 7.9834e+07
------
```

```
value = 2.3950e+08

------

value = 4.7900e+08

------

value = 4.7900e+08

------

Total:

4.7900e+08
```

%Assignment 7 Q2

```
x = linspace(0, 10, 100);
y = sin(x);
i = 1;
while i < 101
  while y(i) < 0
    y(i) = 0;
  endwhile;
  i++;
end
y

plot(x, y)
```

Output




```
y =

 Columns 1 through 15:

         0    0.1008    0.2006    0.2984    0.3931    0.4839    0.5696    0.6496    0.7230    0.7889    0.8469    0.8962
0.9364    0.9670    0.9878
```

Columns 16 through 30:

0.9985 0.9990 0.9893 0.9696 0.9399 0.9007 0.8523 0.7952 0.7300 0.6574 0.5781 0.4928 0.4026 0.3082 0.2107

Columns 31 through 45:

0.1111 0.0103 0 0 0 0 0 0 0 0 0 0 0 0 0

Columns 46 through 60:

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Columns 61 through 75:

0 0 0 0.0804 0.1805 0.2787 0.3742 0.4658 0.5526 0.6338 0.7086 0.7761 0.8358 0.8869 0.9289

Columns 76 through 90:

0.9615 0.9843 0.9971 0.9997 0.9921 0.9744 0.9467 0.9094 0.8629 0.8075 0.7439 0.6727 0.5947 0.5106 0.4213

Columns 91 through 100:

0.3277 0.2308 0.1315 0.0308 0 0 0 0 0 0

```
% Assignment 7 Q3
x = 1; %initial guess
Tol = 0.0000001; % accuracy required
count = 0; % this will count how many iterations it will take
dx=1; % this is a fake value so that the while loop will execute
f=2.3817732907; % because f(-2)=-13 – value at initial guess

fprintf('step x           dx        f(x)\n') % printing values
fprintf('---- ----------- --------- ----------\n')
fprintf('%3i %12.8f %12.8f %12.8f\n',count,x,dx,f)
% main while loop with calculations start here
while (dx > Tol) % it will continue as long as dx > Tol
  count = count + 1;
  fprime = 3*(x^2)+ (2*x)*sin(x) + (x^2)*cos(x) - sin(x); % this will change with every different function
  xnew = x - (f/fprime); % Main step of the Newton's method
  dx=abs(x-xnew); % compute error between two values every step
  x = xnew; % guess is updated
  f = x^3 + (x^2)*sin(x) + cos(x); % compute the new value of f(x)
  fprintf('%3i %12.8f %12.8f %12.8f\n',count,x,dx,f) % writes down results
end
```

Output

```
step x           dx        f(x)
---- ----------- --------- ----------
  0   1.00000000   1.00000000   2.38177329
  1   0.45643621   0.54356379   1.08454375
  2  -0.94549488   1.40193109  -0.98470475
  3  -0.76804278   0.17745209  -0.14360213
  4  -0.73174159   0.03630119  -0.00556295
  5  -0.73021780   0.00152379  -0.00000962
  6  -0.73021516   0.00000264  -0.00000000
  7  -0.73021516   0.00000000   0.00000000
```