Select Command Prompt

```
:\Users\Admin\Downloads\B.Tech\Semester-3\#CM>g++ prg_1.cpp -o prg_1

:\Users\Admin\Downloads\B.Tech\Semester-3\#CM>prg_1

he function is: xe^x-1

nter Values of (a,b) :- 0 1
nter Allowed Error (correct upto x decimal places):: 0.000005
alue of Fucntion at a=0 is :- -1
alue of Fucntion at b=1 is :- 1.71828

he Approximations are ->
(1) = 0.5
(2) = 0.75
(3) = 0.625
(4) = 0.5625
(5) = 0.59375
(6) = 0.578125
(7) = 0.570312
(8) = 0.566406
(9) = 0.568359
(10) = 0.567383
(11) = 0.566895
(12) = 0.567139
(13) = 0.567261
(14) = 0.5672
(15) = 0.567169
(16) = 0.567154
(17) = 0.567146
(18) = 0.567142

he value of root is : 0.567142
```

Command Prompt

```
C:\Users\Admin\Amit_Singhal_11614802722>g++ prg_2.cpp -o prg_2

C:\Users\Admin\Amit_Singhal_11614802722>prg_2

Possible root is between: 2 & 3
Enter initial guess: 2
Enter allowed error: 0.000001
Iteration       |     x                |     f(x)
-------------------------------------------------------
1               |  2.81317             |  0.0636645
2               |  2.74111             |  0.000403968
3               |  2.74065             |  1.49183e-008
4               |  2.74065             |  -7.64949e-014
-------------------------------------------------------
Number of iterations: 4
The value of the root is: 2.74065
```

Command Prompt

```
C:\Users\Admin\Amit>g++ prg_3.cpp -o prg_3

C:\Users\Admin\Amit>prg_3
Function is :: x^3-2x-5
Iteration |    xm     |  f(xm)
-------------------------------
    1     | 2.08126 | -0.147205
    2     | 2.09482 | 0.00304301
    3     | 2.09455 | -2.30377e-005
    4     | 2.09455 | 9.1212e-007
Root of the given equation = 2.09455
No. of iterations = 4
```

Command Prompt

```
C:\Users\Admin\Amit>g++ prg_4.cpp -o prg_4

C:\Users\Admin\Amit>prg_4

-------------------------------
|    x      |    f(x)    |
-------------------------------
|       1   |        3   |
|       2   |        8   |
|       3   |       18   |
|       4   |       32   |
|       5   |       50   |
-------------------------------
Value of f(6) is : 73
```

Command Prompt

```
:\Users\Admin\Amit>g++ prg_5.cpp -o prg_5

:\Users\Admin\Amit>prg_5

nter total number of data :: 5

---------- Enter values of x & f(x)-------------
 x[1]  = 5
(x[1]) = 150
 x[2]  = 7
(x[2]) = 392
 x[3]  = 11
(x[3]) = 1452
 x[4]  = 13
(x[4]) = 2366
 x[5]  = 17
(x[5]) = 5202

 x   | 5   | 7   | 11   | 13   | 17   |
(x) | 150 | 392 | 1452 | 2366 | 5202 |

nter the value of x for which f(x) has to be calculated  ::: 9

alue of f(9) is -> 810
```

Command Prompt

```
C:\Users\Admin>cd Amit_Singhal_11614802722

C:\Users\Admin\Amit_Singhal_11614802722>g++ prg_6.cpp -o prg_6

C:\Users\Admin\Amit_Singhal_11614802722>prg_6

Enter lower limit of integration -> 0
Enter upper limit of integration -> 1
Enter number of sub intervals    -> 12

Value of h -> 0.08333334

        x               f(x)
0.0000000       1.0000000
0.0833333       0.9931034
0.1666667       0.9729730
0.2500000       0.9411765
0.3333333       0.9000000
0.4166667       0.8520710
0.5000000       0.8000000
0.5833334       0.7461140
0.6666667       0.6923077
0.7500000       0.6400000
0.8333334       0.5901639
0.9166667       0.5433962
1.0000000       0.5000000

Required value of integration is: 0.7851088
```

Command Prompt

```
:\Users\Admin\Amit_Singhal>g++ prg_7.cpp -o prg_7

:\Users\Admin\Amit_Singhal>prg_7

nter lower limit: 4
nter upper limit: 5.2
nter number of intervals (n): 6
        |       x       |          log(x)          |
        ---------------------------------------------
        |         4       |          1.38629         |
        |       4.2       |          1.43508         |
        |       4.4       |           1.4816         |
        |       4.6       |          1.52606         |
        |       4.8       |          1.56862         |
        |         5       |          1.60944         |
        |       5.2       |          1.64866         |
esult: 1.82785
```

Command Prompt

```
:\Users\Admin\Amit_Singhal>g++ prg_8.cpp -o prg_8

:\Users\Admin\Amit_Singhal>prg_8

nter lower limit: 0
nter upper limit: 1
nter number of intervals: 6
        |          x          |                 e^x                 |
        ---------------------------------------------------------------
        |                0    |                   1                 |
        |         0.166667    |             1.18136                 |
        |         0.333333    |             1.39561                 |
        |              0.5    |             1.64872                 |
        |         0.666667    |             1.94773                 |
        |         0.833333    |             2.30098                 |
        |                1    |             2.71828                 |
ntegral Result: 1.7183
```

Command Prompt

```
:\Users\Admin\Amit_Singhal>g++ prg_9.cpp -o prg_9

:\Users\Admin\Amit_Singhal>prg_9

-------------- Enter elements of matrix M --------------
 2 3
 5 6
 8 9
-------------- Augmented form [M:I] --------------
 2 3 1 0 0
 5 6 0 1 0
 8 9 0 0 1

-------------- Inverse of M using Gauss Jordan Method --------------
0.67 -1.33 1.00
0.67 3.67 -2.00
.00 -2.00 1.00
```

Command Prompt

```
C:\Users\Admin\Amit_Singhal>g++ prg_10.cpp -o prg_10

C:\Users\Admin\Amit_Singhal>prg_10

Enter the order of matrix:3

Enter matrix elements row-wise
A[1][1]=2
A[1][2]=-1
A[1][3]=0
A[2][1]=-1
A[2][2]=2
A[2][3]=-1
A[3][1]=0
A[3][2]=-1
A[3][3]=2

Enter the column vector
X[1]=1
X[2]=1
X[3]=1

The required eigen value is 3.41463

The required eigen vector is :
[0.707143]
[-1]
[0.707143]
```

```
 \Users\Admin\Amit_Singhal>g++ prg_11.cpp -o prg_11

 \Users\Admin\Amit_Singhal>prg_11

-------------------------------------------------------------------------------------------------------------------
                                        Table of Runge-Kutta Method
-------------------------------------------------------------------------------------------------------------------
terations     |x          |k1          |k2          |k3          |k4          |k           |y          |
-------------------------------------------------------------------------------------------------------------------
              |0          |-0.1        |-0.085      |-0.08575    |-0.071425   |-0.0854875  |0.914512   |
              |0.2        |-0.0714512  |-0.0578787  |-0.0585573  |-0.0455955  |-0.0583198  |0.856193   |
              |0.4        |-0.0456193  |-0.0333383  |-0.0339524  |-0.022224   |-0.0337374  |0.822455   |
              |0.6        |-0.0222455  |-0.0111333  |-0.0116889  |-0.00107664 |-0.0114944  |0.810961   |
              |0.8        |-0.00109609 |0.00895872  |0.00845598  |0.0180583   |0.00863194  |0.819593   |
              |1          |0.0180407   |0.0271387   |0.0266838   |0.0353723   |0.026843    |0.846436   |
              |1.2        |0.0353564   |0.0435886   |0.043177    |0.0510387   |0.0433211   |0.889757   |
              |1.4        |0.0510243   |0.0584731   |0.0581007   |0.0652142   |0.058231    |0.947988   |
              |1.6        |0.0652012   |0.0719412   |0.0716042   |0.0780408   |0.0717221   |1.01971    |
0             |1.8        |0.078029    |0.0841276   |0.0838226   |0.0896467   |0.0839293   |1.10364    |
-------------------------------------------------------------------------------------------------------------------

he value of y at x = 2 is -> 1.10364

 \Users\Admin\Amit_Singhal>g++ prg_11.cpp -o prg_11

 \Users\Admin\Amit_Singhal>prg_11

-------------------------------------------------------------------------------------------------------------------
                                        Table of Runge-Kutta Method
-------------------------------------------------------------------------------------------------------------------
terations     |x          |k1          |k2          |k3          |k4          |k           |y          |
-------------------------------------------------------------------------------------------------------------------
              |0          |0.1         |0.1105      |0.111605    |0.124567    |0.111463    |1.11146    |
              |0.1        |0.124535    |0.140014    |0.141837    |0.161076    |0.141552    |1.25302    |
-------------------------------------------------------------------------------------------------------------------
```