



**ALL FUNCTIONS
OF math.h
HEADER FILE
WITH EXAMPLE
IN C++**

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EXAMPLE OF $\cos^{-1}$, $\sin^{-1}$, $\tan^{-1}$ builtin function in C++

- **Syntax**

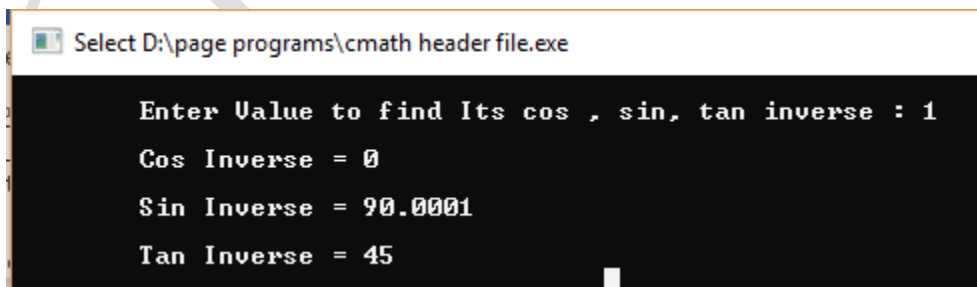
- Double `acos(double);`
- Double `asin(double);`
- Double `atan(double);`
- Return type and parameters are double.. but it returns answer in radians so multiply it by $(180.0/\pi)$ to convert it in degrees

Code:

```
1. #include <iostream>
2. #include <math.h>
3. using namespace std;
4. #define PI 3.14159
5. int main ()
6. {
7. double x, ans;

8. cout<<"\n\tEnter Value to find Its cos , sin, tan inverse : ";
9. cin>>x;
10. cout<<"\n\tCos Inverse = "<< acos(x) * 180.0/PI<<endl;
11. cout<<"\n\tSin Inverse = "<< asin(x) * 180.0/PI<<endl;
12. cout<<"\n\tTan Inverse = "<< atan(x) * 180.0/PI<<endl;

13. return(0);
14. }
```



```
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Enter Value to find Its cos , sin, tan inverse : 1
Cos Inverse = 0
Sin Inverse = 90.0001
Tan Inverse = 45
```

EXAMPLE OF COS , SIN, TAN builtin function in C++

- **Syntax**

- Double cos(double);
- Double sin(double);
- Double tan(double);
- Return type and parameters are double.. but it takes angle in radians so multiply your answer by (pi/180) to convert it in radians

Code:

```
1. #include <iostream>
2. #include <math.h>
3. using namespace std;
4. #define PI 3.14159
5. int main ()
6. {
7.     double x;
8.     cout<<"\n\tEnter Angle to find cos , sin, tan : ";
9.     cin>>x;
10.    cout<<"\n\tCos"<<x<<" = "<< cos(x * PI/180.0) <<endl;
11.    cout<<"\n\tSin"<<x<<" = "<< sin(x * PI/180.0)<<endl;
12.    cout<<"\n\tTan"<<x<<" = "<< tan(x * PI/180.0)<<endl;
13.    return(0);
14. }
```

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```
Enter Angle to find cos , sin, tan : 60
Cos60 = 0.500001
Sin60 = 0.866025
Tan60 = 1.73205
```

EXAMPLE OF coshx , sinhx, tanhx builtin function in C++

- **Syntax**

- Double cosh(double);
- Double sinh(double);
- Double tanh(double);
- Return type and parameters are double..

Code:

```
1. #include <iostream>
2. using namespace std;
3. #include <math.h>
4. int main () {
5.     double x;
6.     cout<<"\n\tEnter value of x to find coshx, sinhx, tanhx : ";
7.     cin>>x;
8.     //coshx hyperbolic cos of x
9.     cout<<"\n\tThe hyperbolic cosine of "<<x<<" = "<<cosh(x);
10.    //sinhx hyperbolic sin of x
11.    cout<<"\n\n\tThe hyperbolic sine of "<<x<<" = "<<sinh(x);
12.    //tanhx hyperbolic tan of x
13.    cout<<"\n\n\tThe hyperbolic tangent of"<<x<<" = "<<tanh(x);
14.    return 0;
15. }
```

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```
Enter value of x to find coshx, sinhx, tanhx : 1.5
The hyperbolic cosine of 1.5 = 2.35241
The hyperbolic sine of 1.5 = 2.12928
The hyperbolic tangent of1.5 = 0.905148
```

EXAMPLE OF EXP FUNCTION OF CMATH LIBRARY

- **SYNTAX**

- Double `exp(double x)`;
- This function **double exp(double x)** returns the value of **e** raised to the **xth** power.

CODE:

1. `#include <iostream>`
2. `using namespace std;`
3. `#include <math.h>`
4. `int main () {`
 - a. `double x;`
 - b. `cout<<"\n\tEnter power x : ";`
 - c. `cin>>x;`
 - d. `cout<<"\n\tThe exponential value of "<< x<<" = "<<exp(x)<<endl;`
5. `return(0);`
6. `}`

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```
Enter power x : 2
The exponential value of 2 = 7.38906
```

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```
Enter power x : 0
The exponential value of 0 = 1
```

EXAMPLE OF LOGARITHMIC FUNCTION OF CMATH LIBRARY

- **SYNTAX**

- **double log(double x)**
 - this function **double log(double x)** returns the natural logarithm (base-e logarithm) of x.
- **double log10(double x)**
 - This function **double log10(double x)** returns the common logarithm (base-10 logarithm) of x.

CODE:

1. `#include <iostream>`
2. `using namespace std;`
3. `#include <math.h>`
4. `int main () {`
 - a. `double x;`
 - b. `cout<<"\nEnter x : ";`
 - c. `cin>>x;`
 - d. `cout<<"\nln ( "<< x<<" ) = "<<log(x)<<endl;`
 - e. `cout<<"\ntlog ( "<< x<<" ) = "<<log10(x)<<endl;`
5. `return(0);`
6. `}`

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```
Enter x : 23.4
ln < 23.4 > = 3.15274
log < 23.4 > = 1.36922
```

EXAMPLE OF MODF FUNCTION IN CMATH

- **SYNTAX:**
- The C library function **double modf(double x, double *integer)** returns the fraction component (part after the decimal), and sets integer to the integer component.
- **double modf(double x, double *integer)**
 - **x** – This is the floating point value.
 - **integer** – This is the pointer to an object where the integral part is to be stored.

CODE:

```
1. #include <iostream>
2. using namespace std;
3. #include<math.h>
4. int main () {
5. double x, fpart, intpart;
   a. cout<<"\n\tEnter x : ";
   b. cin>>x;
6. fpart = modf(x, &intpart);
7. cout<<"\n\tIntegral part = "<< intpart<<endl;
8. cout<<"\n\tFraction Part = "<< fpart<<endl;
9. return(0);
10. }
```

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```
Enter x : 34.653
Integral part = 34
Fraction Part = 0.653
```

EXAMPLE OF POWER FUNCTION IN C++

- SYNTAX:
 - The C library function **double pow(double x, double y)** returns **x** raised to the power of **y** i.e. x^y .

CODE:

1. `#include <iostream>`
2. `using namespace std;`
3. `#include<math.h>`
4. `int main () {`
5. `double x,y;`
 - a. `cout<<"\n\tEnter x : ";`
 - b. `cin>>x;`
 - c. `cout<<"\n\tEnter y : ";`
 - d. `cin>>y;`
 - e. `cout<<"\n\t "<<x<<" ^ "<<y<<" = "<<pow(x,y)<<endl;`
6. `return 0;`
7. `}`

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```
Enter x : 4
Enter y : 3
4 ^ 3 = 64
```

EXAMPLE OF SQRT FUNCTION IN C++

- SYNTAX:
 - The C library function **double sqrt(double x)** returns the square root of x.

CODE:

```
1. #include <iostream>
2. using namespace std;
3. #include<math.h>

4. int main () {
5.     double x;
6.     cout<<"\n\tEnter x : ";
7.     cin>>x;
8.     cout<<"\n\t "<<char(251)<<x<<" = "<<sqrt(x)<<endl;
```

```
9. return(0);  
10. }
```

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```
Enter x : 100  
√100 = 10
```

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```
Enter x : 55  
√55 = 7.4162
```

EXAMPLE OF CEIL and FLOOR FUNCTION IN C++

- SYNTAX:
 - This function **double ceil(double x)** returns the smallest integer value greater than or equal to **x**.
 - This function **double floor(double x)** returns the largest integer value less than or equal to **x**.

CODE:

```
1. #include <iostream>  
2. using namespace std;  
3. #include<math.h>  
4. int main ()  
5. {  
6. double x;  
   a. cout<<"\n\tEnter x : ";  
   b. cin>>x;
```

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- c. `cout<<"\n\t smaller integer value nearest to "<<x<<" = "<<floor(x)<<endl;`
- d. `cout<<"\n\t larger integer value nearest to "<<x<<" = "<<ceil(x)<<endl;`
- 7. `return(0);`
- 8. `}`

```
Enter x : 5.6
smaller integer value nearest to 5.6 = 5
larger integer value nearest to 5.6 = 6
=====
```

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```
Enter x : 7.64
smaller integer value nearest to 7.64 = 7
larger integer value nearest to 7.64 = 8
=====
```

EXAMPLE OF FMOD FUNCTION IN C++

- SYNTAX:
 - The C library function **double fmod(double x, double y)** returns the remainder of **x** divided by **y**.

CODE:

- 1. `#include <iostream>`
- 2. `using namespace std;`
- 3. `#include<math.h>`
- 4. `int main ()`
- 5. `{`
- 6. `double x,y;`
 - a. `cout<<"\n\tEnter x : ";`
 - b. `cin>>x;`
 - c. `cout<<"\n\tEnter y : ";`

- d. `cin>>y;`
- e. `cout<<"\n\tModulus of "<<x<<" / "<<y<<" = "<<fmod(x,y)<<endl;`
- 7. `return(0);`
- 8. `}`

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```
Enter x : 4.7
Enter y : 2.4
Modulus of 4.7 / 2.4 = 2.3
```

EXAMPLE OF ABS/FABS FUNCTION IN C++

- SYNTAX:
 - The C library function **double fabs(double x,)** returns the absolute value of x

CODE:

- 1. `#include <iostream>`
- 2. `using namespace std;`
- 3. `#include<math.h>`
- 4. `int main ()`
- 5. `{`
- 6. `double x;`
 - a. `cout<<"\n\tEnter x : ";`

```
b. cin>>x;
c. cout<<"\n\tAbsolute of "<<x<<" = "<<fabs(x)<<endl;
7. return(0);
8. }
```

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```
Enter x : -34
Absolute of -34 = 34
=====
```

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```
Enter x : -543.32
Absolute of -543.32 = 543.32
```

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