Name: _____ Student ID: _____ Date: _____

Worksheet 12

Standard Functions

Objectives

After completing this worksheet, you should be able to

- Describe the task of important standard functions
- Understand the utilization and the declaration of standard functions
- Apply the standard functions to solve complicated problems in Engineering

1. Open a new project, write program 12.1.

```
#include <stdio.h>
#include <math.h>
int main(int argc, char *argv[ ])
{
 double  a, b, c;
 double  rad, degree = 60;
 rad = (degree * 3.14159) / 180;
  a  =  sin(rad);                b  =  cos(rad);              c  =  tan(rad);
printf("sin %f   =   %f\n",rad,a);
printf("cos %f   =   %f\n",rad,b);
printf("tan %f   =   %f\n\n" ,rad,c);
printf("asin %f   =   %f\n",a,asin(a));
printf("acos %f   =   %f\n",b,acos(b));
printf("atan %f   =   %f\n" ,c,atan(c));

return  0;
}
```

Program 12.1

Run the program and record the results.

sin _____ = _____ asin _____ = _____

cos_____ = _____ acos _____ = _____

tan _____ = _____ atan _____ = _____

2. Open a new project, write program 12.2.

```
#include <stdio.h>
#include <math.h>
int main(int argc, char *argv[ ])
{
double x = 9, y = 2;
printf("%f\n",pow(x, y));
printf("%f\n\n\n",pow(4.5, -2));
printf("%f\n",sqrt(x));
printf("%f\n",sqrt(sqrt(65536)));

return  0;
}
```

Program 12.2

Run the program and record the results.

pow(9, 2) = _____ pow(4.5,-2) = _____

sqrt(9) = _____ sqrt(sqrt(65536)) = _____

Can we use the function ***pow()*** to calculate $-5^{3.2}$? _____

What is the C expression for computing $\sqrt[5]{3125}$?_____

3. Open a new project, write program 12.3.

```
#include <stdio.h>
#include <math.h>
main()
{       printf("%f\n",ceil(2.2908));
        printf("%f\n",ceil(5.83908));
        printf("%f\n",ceil(398));
        printf("%f\n",ceil(-2.6812));
        system("PAUSE");
        return  0;

}
```

Program 12.3

Run Program 12.3 and record the results in Table 12.1.

Function's Input	Step #3	Step #4	Step #5
2.2908			
5.83908			
398			
-2.6812			

Table 12.1

4. Replace the function ***ceil()*** in Program 12.3 with the function ***floor().*** Rerun the program and record the results in Table 12.1.
5. Replace the function ***ceil()*** in Program 12.3 with the function ***round().*** Rerun the program and record the results in Table 12.1.

What is the difference among these 3 statements: **ceil**, **floor** and **round**.

_____

_____

6. Open a new project, write program 12.4.

```
#include <stdio.h>
#include <ctype.h>
main()
{
    char Input = 1;                // Pressing Esc to exit from the while() statement
    while (Input != 27) {
     printf("\nPress any key ...");        Input  =  getche();
     printf("\nResult  =  %d\n",isdigit(Input));
     }

     return  0;
}
```

Program 12.4

Run Program 12.4 and enter the value shown in Table 12.2. Observe and record the result in the table.

7. Replace the isdigit() function in Program 12.4 with other function shown in Table 12.2. Rerun the program and record the results in Table 12.2.

Input	isdigit()	isalnum()	isalpha()	islower()	isupper()	isxdigit()	ispunct()
A							
F							
Spacebar							
a							
Enter							
w							
0							
8							
$							
{							

Table 12.2

8. Open a new project, write program 12.5.

```
#include <stdio.h>
#include <string.h>
main()
{
    char  s1[ ] = “C is a powerful computer language.”;
    char  s2[11];
    printf(“s1 is %d characters long. \n”, strlen(s1));
    strcpy(s2, “I love it.”);
    printf(“s2 contains the string \”%s\” NOW. \n”, s2);
    strcat(s1, s2);
    printf(“The content of s1 is  \”%s\” NOW. \n”, s1);

    return  0;
}
```

Program 12.5

From Program 12.5, run the program and record the result.

_____

_____

_____

Suppose that the declaration and initialization of three string variables in a C program can be shown below:

```
char  str1[ ] = “COMPUTER”;
char  str2[ ] = “computer”;
char  str3[ ] = “COMPUTER”;
```

What are the values produced by these three strcmp().?

strcmp(str1, str2); = _____. The value means that_____

strcmp(str2, str1); = _____. The value means that_____

strcmp(str1, str3); = _____. The value means that_____