





**Question 2:****(9 marks)**

What is the output of the following code segments ? Assume that the library for input/output is included

Code	Output
<pre>double sun = 3, moon = 7, gun = 2.3; sun = moon + 2*gun; gun += sun; moon = gun; cout &lt;&lt; moon &lt;&lt; endl &lt;&lt; sun;</pre>	<pre>13.9 11.6</pre>
<pre>int a = 2, b = 9, c = -3; int s1 = 0, s2 = 0; if ( a == b    a &lt; c ) {     if ( b &gt; a )         s1 = a + b;     s2 = a + c; } else {     if ( b &lt; c )         s1 = b + c;     s2 = b - c; } cout &lt;&lt; s1 &lt;&lt; endl &lt;&lt; s2;</pre>	<pre>0 12</pre>
<pre>int N = 4, f = 1, i; for ( i = 1; i &lt;= N ; i++)     f = f * i; cout &lt;&lt; i &lt;&lt; endl &lt;&lt; f;</pre>	<pre>5 24</pre>
<pre>int n = 13; switch ( n % 9 ) {     case 1:         cout &lt;&lt; n*3 &lt;&lt; endl;     case 2:         cout &lt;&lt; --n &lt;&lt; endl;     case 3:         cout &lt;&lt; n/3 &lt;&lt; endl;     case 4:         cout &lt;&lt; n-3 &lt;&lt; endl;     default:         cout &lt;&lt; n+3 &lt;&lt; endl; }</pre>	<pre>10 16</pre>
<pre>int a=10, b = 1; do {     a = a * 2;     b++; } while ( a &lt; 100 ); cout &lt;&lt; a &lt;&lt; endl &lt;&lt; b;</pre>	<pre>160 5</pre>
<pre>int count=0; bool hello ( int x ) {     count++;     if ( x &gt; 3 &amp;&amp; x &lt; 6 )         return true;     else         return false; } int main() {     int c = 1, s=0;     while ( c &lt; 10 ) {         if ( hello ( c ) )             s = s + 1;         c++;     }     cout &lt;&lt; count &lt;&lt; endl &lt;&lt; s;     return 0; }</pre>	<pre>9 2</pre>

**Question 2 continued on page 4**

### Question 2: continued

Code	Output
<pre>double fun( double x )  {     return 2*x; } int main()  {     cout &lt;&lt; fun(1) + fun(2) &lt;&lt; endl;     cout &lt;&lt; fun( 1 + fun(2) ) &lt;&lt; endl;     return 0; }</pre>	<p>6 10</p>
<pre>int F( int x ); int main() {     int i, s=0;     for ( i=0; i &lt; 5; i++)     {         s = s + F(i);     }     cout &lt;&lt;s;     return 0; } int F( int x ) {     return x*x ; }</pre>	<p>30</p>
<pre>int A[] = { 4, 9, 1, -2, 3, 2, -7, 6}; cout &lt;&lt; A[3] + A[4] &lt;&lt; endl; cout &lt;&lt; A[ A[4] ] &lt;&lt; endl;</pre>	<p>1 -2</p>
<pre>int A[] = { 4, 9, 1, -2, 3, 2, -7, 6}; for ( int i = 1 ; i &lt; 4 ; i++)     A[i-1] = A[i]; cout &lt;&lt; A[0] &lt;&lt; endl &lt;&lt; A[4];</pre>	<p>9 3</p>

### Question 3:

(5 marks)

Write C++ statements to perform the following tasks:

Task	C++ Code
Write a statement to display your name on the output screen	<code>cout &lt;&lt; "Anis";</code>
Rewrite the statements using a <b>single</b> statement <code>x = x - 1;</code> <code>y += x;</code>	<code>y += --x;</code>
Rewrite the following for loop using a while loop <pre>int sum = 0; for ( int x = 10 ; x &gt;= 1 ; x -=2 )     sum += x;</pre>	<pre>int sum = 0, x = 10; while ( x &gt;= 1 ) {     sum += x;     x -= 2; }</pre>
Rewrite the following using a <b>single</b> statement <pre>double x[3];    x[0] = 5; x[1] = 10;     x[2] = 2;</pre>	<code>double x[3] = { 5, 10, 2 };</code>
Declare an array of 20 numbers and initialize them using the formula:  $A[i] = \sqrt{2^i}$	<pre>double A[20]; for ( int c=0; c &lt; 20 ; c++ ) {     A[c] = sqrt ( pow ( 2, c ) ); }</pre>

**Question 4:**

**(5 marks)**

Find the **errors** (syntax or logical) in the following code segments and **correct** them. Assume that the library for input and output is included and note that **each part contains two errors**. (1 mark each part)

Code	Correction
<pre>void main () {   cout &lt;&lt; "The result of 5x6=" &lt;&lt; 5*6 &lt;&lt; "\n";   return 0; }</pre>	<pre>int main () {   cout&lt;&lt;"The result of \"5x6\"="&lt;&lt;5*6&lt;&lt;"\n";   return 0; }</pre>
<pre>int x; cin &gt;&gt; x; if ( 2 &lt; x &lt; 10 )   cout &lt;&lt; x%2 &lt;&lt; endl;   cout &lt;&lt; x%4 &lt;&lt; endl; else   cout &lt;&lt; x%3 &lt;&lt; endl;</pre>	<pre>if ( x &gt; 2 &amp;&amp; x &lt; 10 ) {   cout &lt;&lt; x%2 &lt;&lt; endl;   cout &lt;&lt; x%4 &lt;&lt; endl; } else   cout &lt;&lt; x%3 &lt;&lt; endl;</pre>
<pre>int x, y; while ( y &lt;= 10 )   y = x + 2;   x++; cout &lt;&lt; y;</pre>	<pre>int x=0, y=0; while ( y &lt;= 10 ) {   y = x + 2;   x++; } cout &lt;&lt; y;</pre>
<pre>void get ( double a , double b) {   cin &gt;&gt; a;   cin &gt;&gt; b; } int main() {   double x, y;   cout &lt;&lt; "Enter two numbers: ";   get ( x );   cout &lt;&lt; "you entered:\n"     &lt;&lt; x &lt;&lt; endl &lt;&lt; y;   return 0; }</pre>	<pre>void get ( double &amp;a , double &amp;b) {   cin &gt;&gt; a;   cin &gt;&gt; b; } int main() {   double x, y;   cout &lt;&lt; "Enter two numbers: ";   get ( x , y );   cout &lt;&lt; "you entered:\n"     &lt;&lt; x &lt;&lt; endl &lt;&lt; y;   return 0; }</pre>
<pre>// adding 5 to each element int A[5] = { 3, 5, 6, 4, 1} for ( int i=0 ; i &gt; 5 ; i++ )   A[i] += 5;</pre>	<pre>// adding 5 to each element int A[5] = { 3, 5, 6, 4, 1} ; for ( int i=0 ; i &lt; 5 ; i++ )   A[i] += 5;</pre>

**Question 5:****(5 marks)**

Write a program that calculates and displays the volume and surface area of a cylinder.

- The user should enter the radius of the base and height of the cylinder.
- You have to calculate the surface area and the volume using a **function**
- Assume  $\pi = 3.141592654$  and define it as a **constant global variable**.
- Use the following formulas to calculate the required

$$\begin{aligned} \text{surface area} &= 2\pi r^2 + 2\pi r h \\ \text{volume} &= \pi r^2 h \end{aligned}$$

```
#include <iostream>
using namespace std;

const double pi = 3.141592654;

double area ( double r, double h);
double volume ( double r, double h);

int main()
{
    double r, h;
    cout << "Enter the radius of the cylinder: "; cin >> r;
    cout << "Enter the height of the cylinder: "; cin >> h;

    cout << "The surface area of the cylinder is: " << area(r, h) << endl;
    cout << "The volume of the cylinder is: " << volume(r, h) << endl;
    return 0;
}

double area ( double r, double h)
{
    return ( 2*pi*r*r + 2*pi*r*h ) ;
}

double volume ( double r, double h)
{
    return ( pi*r*r*h );
}
```

**Question 6:****(5 marks)**

Write a program that defines an array of 20 integer numbers, the program asks the user to input 20 integers and stores them in the array. The program should also **count the negative** numbers in the array and **calculate their average** then display the results.

```
#include <iostream>
using namespace std;

int main()
{
    double A[20];
    int c, count=0, sum=0;
    cout << "Enter 20 integers please: ";
    for ( c = 0; c < 20 ; c++)
    {
        cin >> A[c];
    }

    for ( c = 0; c < 20 ; c++ )
    {
        if ( A[c] < 0 )
        {
            count++;
            sum += A[c];
        }
    }

    if ( count != 0 )
    {
        cout << "You entered " << count << " negative numbers" << endl;
        cout << "Their average is " << static_cast<double>(sum) / count << endl;
    }
    else
    {
        cout << "No negative numbers entered";
    }
    return 0;
}
```

```
cout << "GOOD LUCK :)";
```