

```
1 *****
2 * PROGRAMMED BY : Blake Allard , Logan Bonswor
3 * CLASS : CS1A
4 * SECTION : M/W: 8am
5 * LAB #9 : Output - Geometry
6 *****
7
8 Enter the height of the triangle: 12.345
9 Enter the base of the triangle: 15.23
10
11 Enter the width of the rectangle: 17.32
12 Enter the height of the rectangle: 25
13
14 Enter the radius of the circle: 35
15
16
17 Triangle Area Rectangle Area Circle Area
18 94.0072 433 3848.45
19 94 433 3.85e+03
20 94.0 433. 3.85e+03
21 94.007 433.000 3848.448
22 94.007175 433.000000 3848.447750
23 94.0072 433 3848.45
```

```
1 /*****
2 *AUTHOR      :  Blake Allard & Logan Bonswor
3 *STUDENT ID  :  358888      & 1316262
4 *LAB #9      :  Basic Output - Geometry
5 *CLASS       :  CS1A
6 *SECTION     :  M/W 8am
7 *DUE DATE    :  10/14/24
8 *****/
9
10 #include <iostream>          /*cout, cin      */
11 #include <iomanip>           /*setw, setprecision */
12 using namespace std;
13
14 /*****
15 * OUTPUT - The Area of a Triangle, Rectangle, and a Circle
16 *
17 * This program will obtain the dimensions of 3 geometric objects:
18 *     - the area of a triangle
19 *     - the area of a rectangle
20 *     - the area of a circle
21 *
22 * Then calculates, stores, and outputs the area of each triangle, rectangle, and
23 * circle object.
24 *
25 *
26 * INPUT:
27 *     triangleHeight : The height of the triangle
28 *     triangleBase   : The base of the triangle
29 *     rectangleWidth  : The width of the rectangle
30 *     rectangleHeight : The height of the rectangle
31 *     circleRadius   : the radius of the circle
32 *
33 *
34 * OUTPUT: This program will output a table including:
35 *     triangleArea   : The area of the triangle
36 *     rectangleArea   : The area of the rectangle
37 *     circleArea     : The area of the circle
38 *
39 *-----
40 * EXAMPLE INPUT / OUTPUT:
41 *
42 *     Enter the height of the triangle : 12.345
43 *     Enter the base of the triangle   : 15.23
44 *
45 *     Enter the width of the rectangle : 17.32
46 *     Enter the height of the rectangle : 25
47 *
48 *     Enter the radius of the circle   : 35
49 *
50 *
51 * Triangle Area      Rectangle Area      Circle Area
```

```

52 *          94.0072          433          3848.45
53 *          94          433          3.85e+03
54 *          94.0          433.          3.85e+03
55 *          94.007          433.000          3848.448
56 *          94.00718          433.00000          3848.44775
57 *          94.0072          433          3848.45
58 *****/
59 int main()
60 {
61     /*****
62      * CONSTANTS
63      *-----
64      * OUPUT - Used for Class Headings
65      *-----
66      * PROGRAMMER :
67      * CLASS      :
68      * SECTION    :
69      * LAB_NUM     :
70      * LAB_NAME   :
71      *
72      *-----
73      * FORMATTING
74      *-----
75      * PROMPT_COL      : prompt column width
76      * COL_SPACING     : column width
77      * TRIANGLE_AREA_COL : triangle area column width
78      * RECTANGLE_AREA_COL : rectangle area column width
79      * CIRCLE_AREA_COL  : circle area column width
80      *
81      *****/
82
83     // OUTPUT - USED FOR CLASS HEADING
84     const char PROGRAMMER[] = "Blake Allard , Logan Bonswor";
85     const char CLASS[]     = "CS1A";
86     const char SECTION[]   = "M/W: 8am";
87     const int  LAB_NUM     = 9;
88     const char LAB_NAME[]  = "Output - Geometry";
89
90     // FORMATTING - USED FOR SETWS
91     const int PROMPT_COL   = 35;
92
93     const int COL_SPACING  = 5;
94     const int TRIANGLE_AREA_COL = COL_SPACING + 13;
95     const int RECTANGLE_AREA_COL = COL_SPACING + 14;
96     const int CIRCLE_AREA_COL  = COL_SPACING + 11;
97
98     // PI VALUE
99     const double PI        = 3.14159;
100
101     /*****
102      * VARIABLES

```

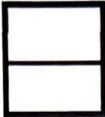
```
103  *****/
104  double triangleHeight; // IN & CALC
105  double triangleBase; // IN & CALC
106  double rectangleWidth; // IN & CALC
107  double rectangleHeight; // IN & CALC
108  double circleRadius; // IN & CALC
109  double triangleArea; // OUT
110  double rectangleArea; // OUT
111  double circleArea; // OUT
112
113
114  /*****
115   * OUTPUT - Class heading
116   *****/
117  cout << left;
118  cout << "*****\n";
119  cout << " * PROGRAMMED BY : " << PROGRAMMER << endl;
120  cout << " * " << setw(14) << "CLASS" << ": " << CLASS << endl;
121  cout << " * " << setw(14) << "SECTION" << ": " << SECTION << endl;
122  cout << " * LAB #" << setw(9) << LAB_NUM << ": " << LAB_NAME << endl;
123  cout << "*****\n\n";
124  cout << right;
125
126
127  /*****
128   * INPUT - read in the following input from the user:
129   * - triangle height
130   * - triangle base
131   * - rectangle width
132   * - rectangle height
133   * - circle radius
134   *****/
135
136  cout << left;
137  cout << setw(PROMPT_COL) << "Enter the height of the triangle: ";
138  cin >> triangleHeight;
139
140  cout << setw(PROMPT_COL) << "Enter the base of the triangle: ";
141  cin >> triangleBase;
142  cout << endl;
143
144  cout << left;
145  cout << setw(PROMPT_COL) << "Enter the width of the rectangle: ";
146  cin >> rectangleWidth;
147
148  cout << setw(PROMPT_COL) << "Enter the height of the rectangle: ";
149  cin >> rectangleHeight;
150  cout << endl;
151
152  cout << setw(PROMPT_COL) << "Enter the radius of the circle: ";
153  cin >> circleRadius;
```

```

154     cout << endl;
155     cout << right;
156
157     /*****
158      * PROCESSING - calculate the area of a
159      *
160      *           - triangle
161      *           - rectangle
162      *           - circle
163      * *****/
164     triangleArea = (triangleHeight * triangleBase) / 2;
165     rectangleArea = rectangleWidth * rectangleHeight;
166     circleArea    = PI * (circleRadius * circleRadius);
167
168
169     /*****
170      * OUTPUT - a table with the area of a triangle, rectangle, and circle as
171      * follows:
172      *
173      *      Triangle Area      Rectangle Area      Circle Area
174      *      94.0072           433           3848.45
175      *      94                433           3.85e+03
176      *      94.0              433.           3.85e+03
177      *      94.007            433.000        3848.448
178      *      94.00718          433.00000      3848.44775
179      *      94.0072           433           3848.45
180      * *****/
181     // FORMATTING - for the floating point numbers
182     cout << setprecision(6);
183
184     // OUTPUT - Space between Input & Output Sections
185     cout << endl;
186
187     // OUTPUT - HEADINGS for the table
188     cout << setw(TRIANGLE_AREA_COL) << "Triangle Area";
189     cout << setw(RECTANGLE_AREA_COL) << "Rectangle Area";
190     cout << setw(CIRCLE_AREA_COL) << "Circle Area";
191     cout << endl;
192     // OUTPUT - DATA (Triangle Area, Rectangle Area, Circle Area)
193     cout << setw(TRIANGLE_AREA_COL) << triangleArea;
194     cout << setw(RECTANGLE_AREA_COL) << rectangleArea;
195     cout << setw(CIRCLE_AREA_COL) << circleArea;
196     cout << endl;
197
198     cout << setprecision(3);
199     cout << setw(TRIANGLE_AREA_COL) << triangleArea;
200     cout << setw(RECTANGLE_AREA_COL) << rectangleArea;
201     cout << setw(CIRCLE_AREA_COL) << circleArea;
202     cout << endl;
203
204     cout << showpoint;

```

```
205     cout << setw(TRIANGLE_AREA_COL) << triangleArea;
206     cout << setw(RECTANGLE_AREA_COL) << rectangleArea;
207     cout << setw(CIRCLE_AREA_COL) << circleArea;
208     cout << noshowpoint;
209     cout << endl;
210
211     cout << fixed;
212     cout << setw(TRIANGLE_AREA_COL) << triangleArea;
213     cout << setw(RECTANGLE_AREA_COL) << rectangleArea;
214     cout << setw(CIRCLE_AREA_COL) << circleArea;
215     cout << endl;
216
217     cout << setprecision(6);
218     cout << setw(TRIANGLE_AREA_COL) << triangleArea;
219     cout << setw(RECTANGLE_AREA_COL) << rectangleArea;
220     cout << setw(CIRCLE_AREA_COL) << circleArea;
221     cout.unsetf(ios::fixed);
222     cout << endl;
223
224     cout << setw(TRIANGLE_AREA_COL) << triangleArea;
225     cout << setw(RECTANGLE_AREA_COL) << rectangleArea;
226     cout << setw(CIRCLE_AREA_COL) << circleArea;
227     cout << endl;
228
229
230
231
232     return 0;
233
234
235
236
237
238 }
239
240
241
242
243
```

Name: Blake AllardClass Day/Times: M/W 8 amDate: 10/14/24**Exercise: OUTPUT****Setprecision, Fixed, & Showpoint****THIS EXERCISE IS TO BE COMPLETED INDIVIDUALLY BY EACH PERSON**

Demonstrate how C++ would evaluate each of the following values given the output statements specified.

const int COL_WIDTH = 13;	
double val1;	val1 = 1234.56789101
double val2;	val2 = 123.4567
float val3;	val3 = 12345
float val4;	val4 = 12.34
float val5;	val5 = 12

```
1. cout << setw(COL_WIDTH) << val1 << endl
   cout << setw(COL_WIDTH) << val2 << endl
   cout << setw(COL_WIDTH) << val3 << endl
   cout << setw(COL_WIDTH) << val4 << endl
   cout << setw(COL_WIDTH) << val5;
```

OUTPUT

1	2	3	4	.	5	7						
1	2	3	.	4	5	7						
1	2	3	4	5								
1	2	.	3	4								
1	2											

```
2. cout << fixed;
   cout << setw(COL_WIDTH) << val1 << endl
   cout << setw(COL_WIDTH) << val2 << endl
   cout << setw(COL_WIDTH) << val3 << endl
   cout << setw(COL_WIDTH) << val4 << endl
   cout << setw(COL_WIDTH) << val5;
```

OUTPUT

1	2	3	4	.	5	6	7	8	9	1		
1	2	3	.	4	5	6	7	0	0			
1	2	3	4	5	.	0	0	0	0	0		
			1	2	.	3	4	0	0	0		
			1	2	.	0	0	0	0	0		

```
3. cout << setprecision(3);
   cout << setw(COL_WIDTH) << val1 << endl
   cout << setw(COL_WIDTH) << val2 << endl
   cout << setw(COL_WIDTH) << val3 << endl
   cout << setw(COL_WIDTH) << val4 << endl
   cout << setw(COL_WIDTH) << val5;
```

OUTPUT

1	.	2	3	E	+	0	3					
1	2	3										
1	.	2	3	E	+	0	4					
1	2	.	3									
1	2											

```
4. cout << showpoint;
   cout << setw(COL_WIDTH) << val1 << endl
   cout << setw(COL_WIDTH) << val2 << endl
   cout << setw(COL_WIDTH) << val3 << endl
   cout << setw(COL_WIDTH) << val4 << endl
   cout << setw(COL_WIDTH) << val5;
```

OUTPUT

1	2	3	4	.	5	7						
1	2	3	.	4	5	7						
1	2	3	4	5	.	0						
1	2	.	3	4	0	0						
1	2	.	0	0	0	0						

```
5. cout << setprecision(3) << fixed;
   cout << setw(COL_WIDTH) << val1 << endl
   cout << setw(COL_WIDTH) << val2 << endl
   cout << setw(COL_WIDTH) << val3 << endl
   cout << setw(COL_WIDTH) << val4 << endl
   cout << setw(COL_WIDTH) << val5;
```

OUTPUT

1	2	3	4	.	5	6	8					
1	2	3	.	4	5	7						
1	2	3	4	5	.	0	0					
			1	2	.	3	4					
			1	2	.	0	0					

```
6. cout << setprecision(3) << showpoint;
   cout << setw(COL_WIDTH) << val1 << endl
   cout << setw(COL_WIDTH) << val2 << endl
   cout << setw(COL_WIDTH) << val3 << endl
   cout << setw(COL_WIDTH) << val4 << endl
   cout << setw(COL_WIDTH) << val5;
```

OUTPUT

1	.	2	3	E	+	0	3					
1	2	3	.	4	5	7						
1	.	2	3	E	+	0	4					
1	2	.	3									
1	2	.	0									

```
7. cout << setprecision(3) << showpoint << fixed;
   cout << setw(COL_WIDTH) << val1 << endl
   cout << setw(COL_WIDTH) << val2 << endl
   cout << setw(COL_WIDTH) << val3 << endl
   cout << setw(COL_WIDTH) << val4 << endl
   cout << setw(COL_WIDTH) << val5;
```

OUTPUT

	1	2	3	4	.	5	6	8				
		1	2	3	.	4	5	7				
1	2	3	4	5	.	0	0					
			1	2	.	3	4					
			1	2	.	0	0					