

NAME Solutions SS# _____

1. Write a small program to input two numbers from the keyboard, *max* and *incr* and count from 0 to *max* in increments of *incr*. For example, if the user enters 10 and 3 then the output will be 0, 3, 6, 9. Use a for loop.

```
#include "stdio.h"
void main () {
    int x, max, incr;
    scanf ("%d %d", &max, &incr);
    for (x=0; x <= max; x = x + incr)
        printf ("%d", x);
}
```

2. Write a function to compute $\sum_{k=1}^n k = 1 + 2 + 3 + 4 + \dots + (n-1) + n$. The input to the function is the integer *n* and the output is the sum. For example if the input is 5 then the output will be 15. Do not use $\sum_{k=1}^n k = \frac{n(n+1)}{2}$. Use a for loop.

```
int sum(int n)
{
    int x, sum = 0;
    for (x = 1; x <= n; x++)
        sum = sum + x;
    return sum;
}
```

3. Write a segment of code to ask the user for 3 numbers in numerical order. Receive the numbers in variables a, b, c. If the numbers do not have this order $a < b < c$ then repeat the process by asking the user to enter the numbers again. Repeat until $a < b < c$.

```
done = False;
```

```
while (!done)
```

```
{  
    printf("enter 3 numbers in order\n");
```

```
    scanf("%d %d %d", &a, &b, &c);
```

```
    if (a < b && b < c)
```

```
        done = True;
```

```
}
```

OR

```
do
```

```
{
```

```
    printf("enter 3 numbers in order\n");
```

```
    scanf("%d %d %d", &a, &b, &c);
```

```
}
```

```
while (a > b || b > c);
```

4. For each of the following code segments indicate what is the output. Assume all variables are declared.

a. `for (x = 0; x < 4; x++)
printf(" %d, ",x);`

0, 1, 2, 3

b. `for (x = -5; x <= 5; x = x + 5)
printf(" %d, ",x);`

-5, 0, 5

c. `for (x = 0, y = 0; x <= 9; x = x + 3)
printf(" %d, ",y++);`

0, 1, 2, 3

d. `for (x = 0; x < 2; x++)
for (y = 2; y > 0; y--)
printf(" %d %d\n",x,y);`

0, 2, 0, 1, 1, 2, 1, 1

0 2
0 1
1 2
1 1

e. `x = 1;
while (x <= 10)
{
printf(" %d, ",x);
x = x * 2;
}`

1, 2, 4, 8

f. `int x = 16;
while (x > 4)
{
for (y = 0; y < 2; y++)
printf(" %d, %d ",x,y);
x = x / 2;
}`

16, 0, 16, 1, 8, 0, 8, 1

g. `x = 0;
while (x < 7)
{
printf(" %d, ",x++);
printf(" %d, ",x++);
printf(" %d, ",x++);
x = x + 2;
}`

1, 2, 3, 6, 7, 8

X
0
1
2

Y
2
0
0

X
16
8
4

Y
0
2
2

5. For each of the following code segments indicate what is the output. Assume the following declarations: `int w = 0, x = 10, y = 20, z = 30;`

- a. `if (w == 0 && x > 16)`
`printf("True");`
`else`
`printf("False");` ← False
- b. `if (w*x == x * x || z + 5 > 30)`
`printf("True");` ← True
`else`
`printf("False");`
- c. `if (x == 10)`
`printf("False");` ← False
`else`
`printf("True");`

6. For each of the following what is the variable assigned. Assume the following declarations:

`float x = 10, y = 20, z = 30, a = 0;`

- a. `a = x + z*x + y;` a is 330
- b. `a = (x + y) / z;` a is 1
- c. `a = (x + y) * (z - x);` a is 600

7. For the mathematical expression, write the equivalent c code to compute the expression and store the result in variable called result. Assume all of the variables used are pre-declared as float. Also assume the function `sqr(x)` returns the square root of x.

$$\frac{x+z}{y} - \sqrt{y(z+7)}$$

`result = (x+z)/y - Sqrt(y*(z+7));`