

Sheet #3: FORTRAN basics

1. Write FORTRAN statement(s) that accomplish the following.
 - a. Declare integer variables x and y. Initialize x to 25 and y to 18.
 - b. Update the value of an integer variable x by adding 5 to it.
 - c. Declare and initialize a float variable payRate to 12.50.
 - d. Copy the value of an integer variable firstNum into an integer variable tempNum.
 - e. Swap the contents of the integer variables x and y. (Declare additional variables, if necessary.)
 - f. Suppose x and y are float variables. Output the contents of x, y, and the expression $x + 12 / y - 18$.

2. Suppose x, y, and z are integer variables and w and t are real variables. What value is assigned to each of these variables after the last statement executes?


```

x = 17;
y = 15;
x = x + y / 4;
z = x % 3 + 4;
w = 17 / 3 + 6.5;
t = x / 4.0 + 15 ** 2 - 3.5;
      
```

3. What is the output of the following statements? Suppose a, m, and b are integer variables, c is a real variable, and $a = 13$, $b = 5$, and $c = 17.5$.
 - a. Write (*,*) a + b - c
 - b. Write (*,*) 15 / 2 + c
 - c. M= a+b-c
write (*,*) m
 - d. Write (*,*) sin (abs (-60))+ sqrt(9)**2

4. Consider the following FORTRAN program in which the statements are in the incorrect order. Rearrange the statements so that it prompts the user to input the length and width of a rectangle and output the area and perimeter of the rectangle.

```

Write(*,*) "Enter the length: "
Read (*,*) length
integer :: length
area = length * width;
end
integer :: width
read(*,*) width
write(*,*) "Enter the width: "
write(*,*) "Area = " , area

```

5. Write a C++ statement(s) that outputs the values of num1 and num2, indicating which is num1 and which is num2. For example, if num1 is 8 and num2 is 5, then the output is:
The value of num1 = 8 and the value of num2 = 5.
6. Write a program called **trig.f90** that prompts for an angle in degrees from the keyboard and then prints out neatly on the screen the sine, cosine and tangent of the angle.
7. Write a program that prompts the user to enter five test scores and then prints the average test score rounded to the nearest integer. (Assume that the test scores are decimal numbers.)
8. Write a simple program to read in the radius and calculate the area of the corresponding circle and volume of the sphere.
9. Write a program to compute the area of a triangle from the lengths of its members by using the following equation :

$$A = \sqrt{P(P - A)(P - B)(P - C)}$$

Where: p = half of parameter, and A,B,C = lengths of members.

10. Newton's law states that the force, F, between two bodies of masses M1 and M2 is given by:

$$F = k \left(\frac{M_1 M_2}{a^2} \right),$$

in which k is the gravitational constant and d is the distance between the bodies. The value of k is approximately 6.67×10^{-8} dyn. cm^2/g^2 . Write a program that prompts the user to input the masses of the bodies and the distance between the bodies. The program then outputs the force between the bodies.