Assignment 2 (Float Operations)

1) Write program, which reads a, b, and c as sides of a triangle and prints area. Hint: Area $= \sqrt{s(s-a)(s-b)(s-c)}$, where $s = \frac{(a+b+c)}{2}$. sqrt(x) will find square root of x. Input: 5 7 10; output: 16.24.

2) Write program, which reads a, b, c, and d and finds distance between points (a, b) and (c, d). Input: 3, 7, 11, 13; Output: 10.

3) Write program, which reads 6 numbers a, b, c, d, e, and f. The program outputs the area of the triangle whose end points are (a, b), (c, d), and (e, f). [Hint: use above two questions]. Input: 7 3 11 3 7 6; Output: 6.

4) Write program, which reads a, b, and c. Let $ax + by + c = 0$ be the equation of a line. The program outputs the slope. Input: 3 5 8; Output: -0.6.

5) Write program, which reads a, b, c, d, and e and prints the distance between point (a, b) and line $cx + dy + e = 0$. [Hint: $\frac{(ac+bd+e)}{(c^2+d^2)^{1/2}}$] Input: 6 7 3 4 2; Output: 9.6.

6) Write program, which reads a, b, and c. Let $x^2 + y^2 + ax + by + c = 0$ be equation of a circle. Print its center and radius. Input: 10, -6, and -2; then output is center $(-5,3)$ and radius 6. Here circle is $x^2 + y^2 + 10x - 6y - 2 = 0$.

7) Write program, which reads a, b, c, p, q and r. Let $ax + by + c = 0$ and $px + qy + r = 0$ be the equations of lines. Print their point of intersection. Input: 4 8 12 2 7 3; Output: $(-5,1)$.

8) Write program, which reads a, b and c as sides of a triangle and prints the angle A in degree and radian. Hint: $a^2 = b^2 + c^2 - 2bc \cos(A)$. [Hint: use a $\cos(A)$. For example:

Input: 13, 12, 5; Output: 90. Input: 10, 20, 17.32; Output: 30. Input: 7, 7, 7; Output 60]

9) Read a, b, c, d, e, f, g, and h. Let $ax + by + cz + d = 0$ be a plane and $x^2 + y^2 + z^2 + ex + fy + gz + h = 0$ be a sphere. Find the area of circle of intersection of the plane and the sphere. For example, Input: 3 4 12 17 – 4 – 2 – 2 – 19; Output: 50.24. Here the center of the sphere is (2,1,1). Its distance from the plane is 3. The radius of the sphere is 5. Hence the radius of the circle of intersection is 4.

10) Write program, which reads h, k, r, and s. Let a circle has center (h, k) and radius r. Let line x = s intersects the circle. The program should calculate the chord length. Input: 2 4 13 7; Output: 24. [Hint: Find distance of the line from the center].