ASSIGNMENT 1 (SECV1113 SEM 2 2020/2021)

QUESTION 1

Develop a program to convert points between different coordinate system.

You need to consider the following requirements:

1. Your program should be able to provide the `user with a menu that offers the following options:
    a. 2D Homogenous to 2D Polar
    b. 3D Cartesian to 3D Spherical
    c. Spherical to cylindrical

2. Get the required inputs from the user.
3. Use the formula you have learned in the class to convert points between different coordinate system

QUESTION 2

Develop a program to implement slope and the division of the line segment.

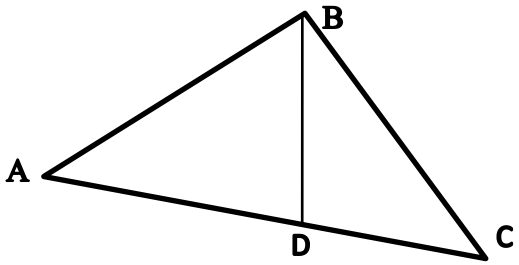
You need to consider the following requirements:

1. Your program should be able to provide the user with a menu that offers the following options:
    a. Ask the user to enter point A and B. If line AB cross y-axis at point P, calculate ratio of AP:PB.
    b. Ask the user to enter point A, point B and ratio AB:PB, find point P that divides line AB
    c. Ask the user to enter point A, point P that divides AB internally and ratio AP:PB. Find point B.
    d. Ask the user to enter point A and slope of line AB. Find x-intercept of line AB
2. Use the formula you have learned in the class to find the result
3. Display the output

QUESTION 3

Develop a program to implement the sin and cos rules.

You need to consider the following requirements



1. Based on Figure above, your program should be able to provide the user with a menu that offers the following options:
   a. Calculate length AC. Ask the user to enter length AB, length BC and angle ∠ ABC
   b. Calculate angle ∠ ADB. Ask the user to enter length DB, length BC and length CD
   c. Calculate angle ∠ ABC. Ask the user to enter length AB, angle ∠ BAD and length BC
   d. Calculate length BD. Ask the user to enter angle ∠ BDC, angle ∠ BCD, and length CD.

2. Use appropriate formula (sin rule or cos rule or both) to calculate and display the output.

QUESTION 4

Develop a program to calculate the roots of the non-linear equations.

You need to consider the following requirements:

a. Lets **f(x) = *ax^3 +bx^2 + cx +d*** is an equation. Your program should be able to get input from user (any value of a, b, c and d). Determine whether the equation is cubic, quadratic or linear equation based on the user input. If the equation is a cubic equation, do question b, c and d.

b. Find the roots of the function if any. If not, give a message. Use the formula you have learned in the class to calculate the root.

c. Find y-intercept.

d. Display the output for a,b and c