Project 7b

The following formula gives the distance between two points (x1, y1) and

(x2, y2) in the Cartesian plane:

Math.sqrt(Math.pow((x2 – x 1), 2) + Math.pow((y2-y1) , 2))

Given the center and a point on a circle, you can use this formula to find the radius of the circle.

Write a program that prompts the user to enter the center and a point on the circle. The program should then output the circle’s radius, diameter, circumference, and area. Your program must have at least the following methods:

1. distance: This method takes as its parameters four numbers that represent two points in the plane and returns the distance between them.
2. radius: This method takes as its parameters four numbers that represent the center and a point on the circle, calls the method distance to find the radius of the circle, and returns the circle’s radius.
3. circumference: This method takes as its parameter a number that represents the radius of the circle and returns the circle’s circumference. (If r is the radius, the circumference is 2 PI \* r.)
4. area: This method takes as its parameter a number that represents the radius of the

circle and returns the circle’s area. (If r is the radius, the area is PI\* r ^ 2.)

1. Use the Math class value for PI
2. The program should validate all user inputs
3. Make sure and generate test cases using a testing grid and use them to validate the output of your program.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Center Input | Second Input | Expected Circumference | Actual Circumference | Reason if Different |
| 0,0 | 5,3 | 36.636… | 36.636… |  |
| 1,5 | 10 | Entry Error | Entry Error |  |
| One,five | 2,54 | Format Error | Format Error |  |

Evaluation:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Aspect | Objectives substantially met  90 – 100% | Meets Minimal Requirements  80-89% | Needs Improvement  79 – 79% | Failure to Meet Requirements  0 - 69% |
| Good Programming Practices  10% | Effective use of white space.  Clear and appropriate documentation.  Implements all needed error handling.  Data types and identifiers meet all expectations. | Use of white space and documentation with minor defect. Implementation of error handling general but lacking in minor aspects.  Selection of data types and / or creation of identifiers not consistent. | Generally meets expectations for good programming practices. | In the main does not meet expectations for good programming practices. |
| Iterative structures  10% | Iterative structure appropriate to the processing needed including validation of all inputs | Iterative structure appropriate to the processing needed but validates only some inputs | Iteration for processing appropriate but input validation not performed | Iteration not used |
| Modularization  40% | Methods properly declared with an appropriate parameter list and provide appropriate return.  Method calls pass parameters correctly | Minor defects in definition of methods or the passing of parameters or return invalid, | Needs improvement in method declaration, method calls, return statements or parameter passing | Fails to properly modularize the algorithm or parameter lists not according to specs or specified return not made |
| Accuracy of Output  40% | All output correct and supported with appropriate testing. | With minor exceptions the output is correct and testing may be missing some needed test cases. | Only part of the output is correct as a result of inadequate test cases. | Only some of the output is correct as a result of missing or misused test cases. |