COW – Primitives, Operators, and Methods

Read through and watch the following Notes and Videos for Lessons 1-6 (Hello World, Primitive Variables, Arithmetic, Methods, Math Class, Standard I/O)

Level 1

Topics: Writing a method with a return, Perform basic calculation using single operator.

Create a class called Calculator1 that has the following methods:

Methods:

Name: calcAreaOfSquare
Input: double length
Output: double result
Action: Takes in the length of the sides of a square. It then calculates and returns the area.

Name: calcResistanceInSeries
Input: double resister1, double resister2
Output: double combinedResistance
Action: calculates the combined resistance of resisters in series. You can do this by adding the two resister values together.

Name: calcAreaOfRectangle
Input: double length, double width
Output: double area
Action: Takes in the length and width of a rectangle. It then calculates and returns the area.

Name: calcMilesPerHour
Input: double miles, double hours
Output: double result
Action: Takes in the number of miles travels and the number of hours traveled and returns the miles per hour.

Name: getProfit
Input: double income, double expenses
Output: double result
Action: Takes in the income and expenses and returns the profit.

Level 2

Topics: Multiple Operators,Order of Operations, Fractions and avoiding integer division

Create a class called Calculator2 that has the following methods:

Methods:

Name: calcVolOfRectPrism
Input: double length, double width, double height
Output: double volume
Action: Takes in the dimensions of a rectangular prism. It then calculates and returns the volume.

Name: calcAreaOfTriangle
Input: double base, double height
Output: double area
Action: Takes in the base and height of a triangle. It then calculates and returns the area.

Name: calcFahrenheitToCelsius
Input: double fahrenheitTemp
Output: double celciusTemp
Action: converts a temperature from Fahrenheit to Celsius.

Name: calcCelsiusToFahrenheit
Input: double celciusTemp
Output: double fahrenheitTemp
Action: converts a temperature from Celsius to Fahrenheit.

Name: calcSlope
Input: double x1, double y1, double x2, double y2
Output: double slope
Action: Takes in the coordinates of two points. It then calculates and returns the slope of the line going through those two points.

Level 3

Topics: Math Class Constants and Methods

Create a class called Calculator3 that has the following methods:

Methods:

Name: calcDifference
Input: double x1, double x2
Output: double measure
Action: calculates the difference between two numerical values, keep in mind that difference should always positive. Hint – use a method of the math class for this.

Name: calcAreaOfCircle
Input: double lengthOfRadius
Output: double areaOfCircle
Action: Takes in the length of the radius of a circle. It then calculates and returns the area.

Name: calcVolOfSphere
Input: double lengthOfRadius
Output: double volume
Action: Takes in the radius of a sphere. It then calculates and returns the volume.

Name: calcGravity
Input: double mass1, double mass2, double radius
Output: double gravitationalForce
Action: returns the gravitational force between two obejcts with the first having a mass stored in mass1, the second with a mass stored in mass2, and the distance between them which is stored in radius. Use $6.67408 * 10^{-11}$as your gravitational constant.

Name: calcVolumeOfCone
Input: double height, double radius
Output: double volume
Action: Takes in the dimensions of a cone. It then calculates and returns the volume.

Level 4

Topics: Equation Manipulation, Multiple Steps

Create a class called Calculator4 that has the following methods:

Methods:

Name: calcLengthOfRadius
Input: double areaOfCircle
Output: double lengthOfRadius
Action: Takes in the area of a circle. It then calculates and returns the length of the radius.

Name: calcResistanceInParallel
Input: double resister1, double resister2
Output: double combinedResistance
Action: calculates the combined resistance of resisters in parallel

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Name: calcDistance
Input: double x1, double y1, double x2, double y2
Output: double distance
Action: Takes in the coordinates of two points. It then calculates and returns the distance between those two points.

Name: calcIntercept
Input: double x1, double y1, double x2, double y2
Output: double yIintercept
Action: Takes in the coordinates of two points. It then calculates and returns the y-intercept of the line passing through those two points.

Name: calcSurfaceAreaOfCone
Input: double height, double radius
Output: double surfaceArea
Action: Takes in the dimensions of a cone. It then calculates and returns the surface area.

Level 5

Topics: Math Class Trig Methods, Complex Equations

Create a class called Calculator5 that has the following methods:

Methods:

Name: calcCompoundInterest
Input: double initialDeposit, double interestRate, double numCompounded, double numYears
Output: double futureValue
Action: Calculates the future value of an investment given the initial deposit, interest rate, the number of times per year the interest is compounded, and the number of years invested.

Name: calcContinousCompoundInterest
Input: double initialDeposit, double interestRate, double numYears
Output: double futureValue
Action: Calculates the future value of an investment given the initial deposit, interest rate, and the number of years invested.

Name: calcFirstRootOfQuadratic
Input: double a, double b, double c
Output: double quadratic
Action: Calculates the first of two roots for a quadratic equation given the three coefficients

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Name: calcHeight
Input: double angleOfElevation, double distance
Output: double height
Action: given an angle of elevation and distance to the building/object, return the height of the object. The angle of elevation is in degrees.

Name: calcAngleOfElevation
Input: double height, double distance
Output: double angle
Action: given the distance to the building/object and the height of the building/object, return the angle of elevation in degrees.

Level 6

Create a class called Calculator6 that has the following methods:

Methods:

Name: calcHalfLife
Input: double startingAmount, double currentAmount, double elapsedTime
Output: double halfLife
Action: Takes in how much radioactive material there was at the start, how much time has elapsed, and the current amount of radioactive material. It then calculates and returns the half life.

Name: calcStandardDeviation
Input: double num1, double num2, double num3, double num4, double num5
Output: double standardDeviation
Action: given five numbers, calculate the standard deviation of the set of five numbers. This should be the standard deviation for a population and not a sample (ie – divide by n and not n-1)

Name: solveSystemOfEquations
Input: double a1, double b1, double c1, double a2, double b2, double c2
Output: x value of the solution
Action: Takes in the coefficients for equations of lines in standard form. It then returns the x value of the solution.

Name: calcPyramidSurfaceArea
Input: double height, double sideLength, double numSides
Output: double area
Action: Takes in the height and side length of a pyramid. It also takes in the number of sides that base has. It then calculates the surface area of the pyramid which includes the base and all the sides.

Name: calcPyramidVolume
Input: double height, double sideLength, double numSides
Output: double area
Action: Takes in the height and side length of a pyramid. It also takes in the number of sides that base has. It then calculates the pyramid's volume.