OsloMet – Oslo Metropolitan University

MEK3100 – Programming 2

Worksheet 2

Variables and Basic Arithmetic

Purpose:

In this worksheet, you will familiarize yourself with the C++ programming environment and write your first own short programs.

Tasks:

a. One mile equals 1.609 kilometers. Write a C++ program that takes the user input distance in miles and converts it to kilometers.

b. Write a C++ program that computes the volume and area of a sphere using the following formulas:

$$V = \frac{4}{3}\pi r^3$$

$$A = 4\pi r^2$$

Test the program using the following values for the radius: 1, 6, 12.2, 0,2

c. Modify your program in Task (d) such that it uses a constant for π value.

d. Write a C++ program that accepts x, and y coordinates of two points and calculate and displays the coordinates of the midpoint of the line segment connecting these points. Given (x1, y1) and (x2, y2) coordinates, the midpoint coordinates are ((x1+x2)/2, (y1+y2)/2). For example, your program can work as follows:

```
Enter x1: 2
Enter y1: 10
Enter x2: 12
Enter y2: 6
The x midpoint coordinate is: 7
The y midpoint coordinate is: 8
```

e. The mathematical formula for the total amount of the money invested with the interest compounded annually is:

$$y = p(1 + r)^n$$

where **y** is the total amount, **p** is the principal invested, **r** the interest rate, and **n** the number of years. Write a C++ program to calculate the total amount of the money after 30 years for the invested principal of $10000 with an 8 percent interest rate.

f. Modify your program in Task (e) such that it takes p, r, and n values from the user and calculates the y value accordingly.