Assume you are writing a Java program that is going to need memory locations for the following information. Write the required declaration statements for each of the following: You have two things to consider:
a) type of data (int, double, boolean, char or String)
b) an appropriate name (don't forget to use camel notation)

For example, for a company's net sales we would have: double netSales;
a) Age of an employee in years
```
int employeeAge;
```
b) Customer's street address
```
String customerAdress;
```
c) Mass of an object in a Science experiment
```
double objectMass;
```
d) Employee's rate of pay (e.g. $7.45/hour)
```
double employeePayRate;
```
e) 4-digit employee number
```
int employeeNumber;
```
f) Single digit product price code (e.g. A, B, C, D, ..., H)
```
char priceCode;
```
g) Customer's phone number
```
int customerPhoneNumber;
```
h) Number of students in a class
```
int students;
```

2) Java stores characters using Unicode while earlier languages used ASCII. What is the difference between the two coding systems? Why does Java use Unicode? Are there any advantages to using ASCII?

Unicode has global coverage and has a higher scope, meaning that java uses it to ensure that software behaves the same across different machines. The advantages to using ASCII are that it is much more efficient and simple.

3) Another primitive integer type in Java is a byte. A byte is an 8-bit integer. What range of values can we store in a byte variable?

A byte can support up to 256 different values

4) For larger integers you can use a long variable. A long is a 64-bit integer. What range of values can we store in a long variable?

The range of values in a long variable is approximately -9.22×10^{18} to 9.22×10^{18}

5) Why would you want to use the final modifier when declaring a variable? Give a

specific example.

The final modifier is used when you don't want to ever change the value of a variable in the code. An example the final modifier would be used is the name of a specific thing.

6) How are primitive data types different from object references? Explain your answer by comparing what happens when you declare and initialize an integer variable to what happens when you declare and initialize a string variable.

A primitive data type stores one raw value and object references hold many pieces of data. When you declare an integer variable it the raw number is stored. When an integer value is stored, Java allocates 32 bits of memory on your device. When a String value is stored, java allocates memory for a reference variable.

7) List the methods for inputting each of the primitive types.

```
nextBoolean()
nextInt()
nextShort()
nextLong()
nextByte()
nextFloat()
nextDouble()
```

8) What is the best way to read in a String? Explain.

Using the java Scanner class you can read a string easily. By using nextLine() you can read strings.

9) Evaluate the following numeric expressions without a computer

a) 58 / 6 9 int
b) 31 % 10 1 int
c) 17 * 2 + 3 * 4.5 37. 5 double
d) 3.0 + 117 % 7 8.0 double
e) 14 + 18 / 4 18 int
f) 4.2 * 3 12.6 double
g) (int) Math.round(3.78) 4 int
h) Math.max(15, 14.2) 15.0 double
i) Math.sqrt(7) 2.6457513110645906 double
j) Math.min(12, 7) 7 int
k) Math.pow(3,2) 9.0 double
Indicate whether the final result will be a double or an int.

10) Given an integer variable called count, show 4 different ways to add 1 to count.

```
count++
++count
count += 1
count = count + 1
```

11) Write the necessary Java code to generate a random integer number between –5 and 17 inclusive (including both –5 and 17).

```
int max = 17
int min = -5
int number = (int) Math.random() * (max - min + 1) + min;
```

12) Write a program that reads in the length and the width of a rectangle and then calculates and displays the area.

```java
import java.util.Scanner;

public class RectangleArea {
   public RectangleArea() {}

   public void display() {
       Scanner scanner = new Scanner(System.in);
       System.out.print("Length of the rectangle:");
       int length = scanner.nextInt();
       System.out.print("Width of the rectangle:");
       int width = scanner.nextInt();

       System.out.printf("The area of the rectangle is: %d", length*width);
   }

   public static void main(String[] args) {
       RectangleArea r = new RectangleArea();
       r.display();
   }
}
```

13) Write a program that finds the surface area and volume of a cylinder given its height and radius. Round your answers to the one decimal place. The formulae for the

surface area and volume of a cylinder are:
SA = 2π rh + 2π r2 V = π r2h

```
import java.util.Scanner;

public class CylinderCalculator {
   public CylinderCalculator() {}

   public void display() {
       Scanner scanner = new Scanner(System.in);
       System.out.print("Height of the cylinder:");
       int height = scanner.nextInt();
       System.out.print("Radius of the cylinder:");
       int radius = scanner.nextInt();

       System.out.printf("The surface area of the cylinder is: %.1f and the
volume is %.1f",
               Math.TAU*radius*height + Math.TAU*radius*2,
               Math.PI * radius * 2 * height
       );
   }

   public static void main(String[] args) {
       CylinderCalculator r = new CylinderCalculator();
       r.display();
   }
}
```

14) Write a program that rounds a number to the nearest 1, 10, 100 or 1000. The user should enter the number to be rounded as well as how it should be rounded. For example, if you wanted to round 5687 to the nearest 10, the answer would be 5690.

```
import java.util.Scanner;

public class NumberRounder {
   public NumberRounder() {}

   public void display() {
       Scanner scanner = new Scanner(System.in);
       System.out.print("The number you want to round:");
       double Number = scanner.nextDouble();
       System.out.print("Round to the nearest 1, 10, 100, 1000:");
```

```
        int round = scanner.nextInt();

        System.out.printf("The rounded number is: %d", (int) (Number + 5) /
round * round);
    }

    public static void main(String[] args) {
        NumberRounder r = new NumberRounder();
        r.display();
    }
}
```

15) A slice of pizza contains 355 calories. Cycling at a certain pace burns around 550 calories per hour. Write a program to figure out how long you would have to cycle to burn off a certain number of pizza slices. Give your answer in hours rounded to two decimal places. Extra: Give your answer in hours and minutes (rounded to the nearest minute).

```
import java.util.Scanner;

public class PizzaBurner {
    public PizzaBurner() {}

    public void display() {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the number of pizza slices: ");
        int slices = scanner.nextInt();

        double caloriesPerSlice = 355.0;
        double burnRatePerHour = 550.0;

        double totalCalories = slices * caloriesPerSlice;
        double totalHours = totalCalories / burnRatePerHour;

        System.out.printf("Hours to burn off: %.2f %n", totalHours);

        int totalMinutes = (int) Math.round(totalHours * 60);
        int hours = totalMinutes / 60;
        int minutes = totalMinutes % 60;
        System.out.printf("That is around %d hours and %d
minutes",hours,minutes);
    }
```

```
    public static void main(String[] args) {
        PizzaBurner p = new PizzaBurner();
        p.display();
    }
}
```