Question 1 （Variable） 10 marks

Show the output of the following code segments. If an error occurs, print "error" as your answer & explain the error.

a) `int num1 = 3;`
`double num2 = 4.2;`
`int num3 = num1 + num2;`
`System.out.println(num3);`
	b) `int num1 = 3.3;`
	`double num2 = 9.1;`
	`int num3 = num1 + num2;`
	`System.out.println(num3);`

c) `int num1 = 3;`
`double num2 = 4.2;`
`double num3 = num1 + num2;`
`System.out.println(num3);`
	d) `double 1num = 3;`
	`double 2num = 4.2;`
	`double 3num = 1num + 2num;`
	`System.out.println(3num);`

e) `int num1 = 3, num2 = 2;`
`double num3 = num1 + num2;`
`System.out.println(num3);`
	f) `int num1 = 3, num2;`
	`double num3 = num1 + num2;`
	`System.out.println(num3);`

g) `int num1 = 3;`
`int num2 = 4;`
`System.out.println(num1 + num2);`
	h) `int num1 = 3;`
	`int num2 = num1;`
	`num1 = 5;`
	`System.out.println(num2);`

i) `int num1 = 3;`
`int num2 = num1;`
`num1 = 5 – num1 + 2;`
`System.out.println(num2 + " " + num1);`
	j) `int num1 = 33;`
	`int num2 = num1 % 5 * -3;`
	`System.out.println(num2);`

Question 2 （operation） 8 marks

Show the output of the following code segments. If an error occurs, print "error" as your answer & explain the error.

1. `int num = 11;`
`double result = (double) num / 2;`
`System.out.println(result);`
	2. `int num = 456;`
	`int digit = num % 10;`
	`System.out.println(digit);`

3. `int num = 456;`
`int num2 = num / 10;`
`int num3 = num2 / 10;`
`System.out.println(num3);`
	4. `int num = 456;`
	`int num2 = num / 10;`
	`int num3 = num2 / 10;`
	`System.out.println(num - num3 * 100);`

5. `int num = 23, other = 45;`
`int digit = num % 10 + other % 10;`
`int digit2 = num / 10 + other / 10;`
`System.out.println(digit + "" + digit2);`
	6. `int num = 45678;`
	`System.out.println(num % 10000 / 1000);`

7. `int num = 45678;`
`System.out.println(num % 1000 / 100);`
	8. `int num = 7658;`
	`int num2 = num / 100;`
	`int num3 = num2 / 10;`
	`System.out.println(num - num3 * 1000);`

Question 3 （Debug） 6 marks

1. The following code should calculate the cost of a trip that is 300 miles if gas is $2.50 a gallon and your car gets 36 miles per gallon. However, the code has syntax errors, like missing semicolons, wrong case on names, or unmatched " or (. Fix the code so that it compiles and runs correctly.

```java
public class Test1
{
    public static void main(String[] args)
    {
        int tripMiles = 300
        Double price = 2.50;
        int milesPerGallon = 36;
        double numberOfGallons = tripmiles / milesPerGallon;
        double totalCost = numberOfGallons * price;
        System.out.println(totalCost);
    }
}
```

2. The following code should calculate the body mass index (BMI) for someone who is 5 feet tall and weighs 110 pounds. However, the code has syntax errors, like missing semicolons, wrong case on names, or unmatched " or (. Fix the code so that it compiles and runs correctly.

```java
public class Test1
{
    public static void main(String[] args)
    {
        double Height = 60;     // in inches (60 inches is 5 feet)
        double weight  110;     // in pounds
        double heightSquared = height  height;
        double bodyMassIndex = weight / heightSquared
        double bodyMassIndexMetric = bodyMassIndex * 703;
        System.out.println(bodyMassIndexMetric);
    }
}
```

Question 4 Programming 16 marks

    1.   Write a program that Design a program to give the exact change with the least number of coins for a given number of cents (user input).
Using quarters (25 cents), dimes (10 cents), nickels (5 cents), and 1 cent.
Your output likes:

```
Input the number of cents 137
The quarters is 5
The dimes is 1
The nickels is 0
The cents is 2
```

2. Following the comments below to write a program that compute some statistics.

    HIT:

    a) $Variance\ of\ the\ data\ =\ [(num1 - ave)^2 + (num2 - ave)^2 + (num3 - ave)^2 ...]/n$

    b) $Standard\ deviation = \sqrt{variance}$

    c)   Use Math.pow(base,exponet) eg: Math.pow(2, 3) is 8.0.

    d)   Use Math.sqrt(number) for square root. eg: Math.sqrt(9) is 3

```
public class Statistics
{
    public static void main(String[] args)
    {
/* 1. Declare 3 int variables for grades and use Scanner for inputs.
    2. Declare an int variable for the sum of the grades
    3. Declare a double variable for the average of the grades
    4. Write a formula to calculate the sum of the 3 grades
    5. Write a formula to calculate the average of the 3 grades from the
        sum using division and type casting.
    6. Print out the average
    7. Declare a double variable and calculate the variance
    8. Declare a double variable to compute the standard deviation.
    9. Print out the variance and standard deviation.
*/
    }
}
```

Output:
```
Enter grade: 78
Enter grade: 80
Enter grade: 77
Average = 78.33333333333333
Variance = 1.5555555555555556
Standard deviation = 1.247219128924647
```