1 Give the value of `a` after the execution of each of the following sequences. (3)

(a)
```
int a = 1;
a = a + a;
a = a + a;
a = a + a;
```

(b)
```
double a = 2;
a = a * a;
a = a * a;
a = a * a;
```

(c)
```
boolean a = true;
a = !a;
a = !a;
a = !a;
```

2 Why does `10 / 3` result in the value `3` instead of `3.33333333`? What modifications would you need to make to ensure the value `3.33333333`? (3)

3 What do each of the following print? (5)

(a) `System.out.println(2 + "bc");`

(b) `System.out.println(2 + 3 + "bc");`

(c) `System.out.println((2 + 3) + "bc");`

(d) `System.out.println("bc"+ (2 + 3));`

(e) `System.out.println("bc"+ 2 + 3);`

4 A physics student gets unexpected results when using the code: (5)

```
F = G * mass1 * mass2 / r * r;
```

to compute values according to the formula $F = Gm_1m_2/r^2$. Explain the problem with the code and indicate how you would fix it.

5 *Rolling Dice.* Write a program that generates and prints two random integers between 1 and 6 (as if you were rolling dice). (10)

Hint: You can use `Math.random()` to generate a random number. Experiment with its output before deciding how you can use it to restrict your values to the desired results.

6 *Loan Payments.* Write a program that calcualtes the monthly payments you would have to make over a given number of years to pay off a loan at a given interest rate, compounded continuously. Given the number of years, t, the principal, P, and the annual interest rate, r, the total amount paid at the end of a loan is given by the formula: $A = Pe^{rt}$. (20)

Hint: Use `Math.exp(n)` to calculate e^n.