Assignment # 1

1. (Weight: 20%) For the following T(n) find values of n_0 and c such that cn^3 is larger than T(n) for all n larger than n_0.

$T(n) = n^3 - 5n^2 + 20n - 10$

2. (Weight: 15%) Write a program that compares the values of y1 and y2 in the following expressions for values of n up to 100 in increments of 10. Does the result surprise you?

```
y1 = 100 * n + 10
y2 = 5 * n * n + 2
```

3. (Weight: 45%) Write T(n) and big-O expressions for the following loops (explain how the result came about):

3.1.
```
for (int i = 0; i < n; i++)
    for (int j = 0; j < i * i; j++)
      cout << j << endl;
```

3.2.
```
for (int i = n; i >= 0; i -= 2)
    cout << i << endl;
```

3.3.
```
for (int i = 0; i < n; i++)
        for (int j = i; j > 0; j /= 2)
         cout << j << endl;
```

4. (Weight: 20%) Show what happens in the figure below when the following statement executes:
v2.pop_back();