Task 1

Code

```cpp
#include<iostream>
#include<vector>
using namespace std;

int main()
{
    int value,i;
    vector<int> x;
    for(int i=0;i<5;i++) {
        cout<<"enter element of vector "<<endl;
        cin>>value;
        x.push_back(value);

    }
    cout<<endl;
    cout<<"vector: "<<endl;
    for(int i=0;i<5;i++) {
        cout<<x.at(i)<<" , ";
    }
    x.erase(x.begin()+4);
    x.insert(x.begin()+4,5);
    cout<<endl<<"new vector after removing element from 5th position and entering 5 is "<<endl;
    for(int i=0;i<5;i++) {
        cout<<x.at(i)<<" , ";
    }


return 0;
```

Output

```
enter element of vector
1
enter element of vector
2
enter element of vector
3
enter element of vector
4
enter element of vector
6

vector:
1 , 2 , 3 , 4 , 6 ,
new vector after removing element from 5th position and entering 5 is
1 , 2 , 3 , 4 , 5 ,
--------------------------------
```

Task 2

Code

```cpp
double calculateMean(const std::vector<int> &grades) {
    int sum = 0;
    for (size_t i = 0; i < grades.size(); i++) {
        sum += grades[i];
    }
    return static_cast<double>(sum) / grades.size();
}

int calculateMedian(std::vector<int> grades) {
    size_t n = grades.size();
    for (size_t i = 0; i < n - 1; i++) {
        for (size_t j = 0; j < n - i - 1; j++) {
            if (grades[j] > grades[j + 1]) {
                int temp = grades[j];
                grades[j] = grades[j + 1];
                grades[j + 1] = temp;
            }
        }
    }
    return (n % 2 == 0) ? (grades[n / 2 - 1] + grades[n / 2]) / 2 : grades[n / 2];
}

int calculateMode(const std::vector<int> &grades) {
    int maxFreq = 0, mode = 0;

    for (size_t i = 0; i < grades.size(); i++) {
        int repeat = 0;
        for (size_t j = 0; j < grades.size(); j++) {
            if (grades[i] == grades[j]) {
                repeat++;
            }
        }
        if (repeat > maxFreq) {
            maxFreq = repeat;
            mode = grades[i];
        }
    }
        }
    }
    return mode;
}

void displayStudentsWithModeGrade(const std::vector<std::string> &names, const std::vector<int> &grades, int mode) {
    std::cout << "Students with grades equal to mode: ";
    for (size_t i = 0; i < grades.size(); i++) {
        if (grades[i] == mode) {
            std::cout << names[i] << ", ";
        }
    }
    std::cout << std::endl;
}

int main() {
    std::vector<std::string> names;
    std::vector<int> grades;
    int num, input;
    std::string name;

    std::cout << "Enter number of students: ";
    std::cin >> num;

    for (int i = 0; i < num; i++) {
        std::cout << "Enter student name: ";
        std::cin >> name;
        names.push_back(name);

        std::cout << "Enter grade in %: ";
        std::cin >> input;
        grades.push_back(input);
    }

    double mean = calculateMean(grades);
    std::cout << "Mean: " << mean << std::endl;

    int median = calculateMedian(grades);
    std::cout << "Median: " << median << std::endl;
```

```
    int median = calculateMedian(grades);
    std::cout << "Median: " << median << std::endl;

    int mode = calculateMode(grades);
    std::cout << "Mode: " << mode << std::endl;

    displayStudentsWithModeGrade(names, grades, mode);

    return 0;
}
```

Output

```
D:\c++\lab tasks\lab maual 10.exe
Enter number of students: 4
Enter student name: we
Enter grade in %: 34
Enter student name: fh
Enter grade in %: 64
Enter student name: cnjg
Enter grade in %: 86
Enter student name: dghj
Enter grade in %: 97
Mean: 70.25
Median: 75
Mode: 34
Students with grades equal to mode: we,
```

Task 3

Code

```
class Triangle {
public:
    int length1;
    int length2;
    int length3;

    Triangle() : length1(6), length2(8), length3(10) {}

    int getPerimeter() {
        return length1 + length2 + length3;
    }

    double getArea() {
        double s = getPerimeter() / 2.0;
        return sqrt(s * (s - length1) * (s - length2) * (s - length3));
    }
};

int main() {
    Triangle tri;
    int perimeter;
    double area;

    perimeter = tri.getPerimeter();
    area = tri.getArea();

    std::cout << "Area is: " << area << std::endl;
    std::cout << "Perimeter is: " << perimeter << std::endl;

    return 0;
}
```

```
Area is: 24
Perimeter is: 24


------------------------
Process exited after 0.11
```

Task 4

Code

```
int main() {
    const int numEmployees = 10;
    Employee employees[numEmployees];

    // Input employee details
    for (int i = 0; i < numEmployees; ++i) {
        cout << "Enter name of employee " << i + 1 << ": ";
        cin >> employees[i].name;

        cout << "Enter salary for employee " << i + 1 << ": ";
        cin >> employees[i].salary;

        cout << "Enter hours of work per day for employee " << i + 1 << ": ";
        cin >> employees[i].hoursPerDay;

        cout << endl;

        // Adjust salaries based on hours worked per day
        if (employees[i].hoursPerDay >= 12) {
            employees[i].salary += 150;
        } else if (employees[i].hoursPerDay >= 10) {
            employees[i].salary += 100;
        } else if (employees[i].hoursPerDay >= 8) {
            employees[i].salary += 50;
        }
    }

    // Display employee details with final salaries
    cout << "Employee Details:" << endl;
    for (int i = 0; i < numEmployees; ++i) {
        cout << "Name: " << employees[i].name << ", Final Salary: $" << employees[i].salary << endl;
    }

    return 0;
}
```

Output

```
Enter name of employee 5: rryu
Enter salary for employee 5: 355
Enter hours of work per day for employee 5: 43

Enter name of employee 6: rhjk
Enter salary for employee 6: 445
Enter hours of work per day for employee 6: 45

Enter name of employee 7: rtyujhr
Enter salary for employee 7: 345
Enter hours of work per day for employee 7: eryt

Enter name of employee 8: Enter salary for employee 8: Enter hours of work per day for employee 8:
Enter name of employee 9: Enter salary for employee 9: Enter hours of work per day for employee 9:
Enter name of employee 10: Enter salary for employee 10: Enter hours of work per day for employee 10:
Employee Details:
Name: gsh, Final Salary: $2606
Name: ryd, Final Salary: $495
Name: egery, Final Salary: $195
Name: ttt, Final Salary: $506
Name: rryu, Final Salary: $505
Name: rhjk, Final Salary: $595
Name: rtyujhr, Final Salary: $345
Name: , Final Salary: $150
Name: , Final Salary: $150
Name: , Final Salary: $nan
```