

Largest Perimeter triangle in C++

```
#include <iostream>
#include <vector>
#include <algorithm>

using namespace std;

int largestPerimeter(vector<int>& nums)
{
    sort(nums.begin(), nums.end());

    int p = 0;

    for (int i = nums.size() - 1; i >= 2; --i) {
        if (nums[i - 1] + nums[i - 2] >
            nums[i]) {
            p = nums[i - 1] + nums[i - 2] +
                nums[i];
            break;
        }
    }

    return p;
}

int main() {
    vector<int> nums = {25, 6, 9, 11, 8, 12,
        10, 3, 2};

    cout << largestPerimeter(nums) <<
        endl;

    return 0;
}
```

Step-by-step check after sorting:

nums = {2, 3, 6, 8, 9, 10, 11, 12, 25}

We're looping from the end (i = 8) down to 2, checking this:

if (nums[i-1] + nums[i-2] > nums[i]) // triangle inequality

🧠 Dry Run Table with Full Checks:

| i | nums[i-2] | nums[i-1] | nums[i] | Sum of two smallest | Valid triangle? | Perimeter |
|---|-----------|-----------|---------|---------------------|-----------------|-----------|
| 8 | 11 | 12 | 25 | 11 + 12 = 23 | ✗ (23 < 25) | - |
| 7 | 10 | 11 | 12 | 10 + 11 = 21 | ✓ | 33 |

So, yes — the **first valid triangle** found is {10, 11, 12}, with perimeter = 33.

✗ Why not {11, 12, 25}?

Because 11 + 12 = 23, which is **less than 25** — **fails triangle condition**.

✓ Correct Output:

33