

Suppose `v` is a `vector<int>` with at least one element. Write code to (6 pts each):

1. Print the number of elements in `v`.

```
// ANSWERS
cout << int(v.size());
```

2. Print the first element in `v`.

```
cout << v[0];
```

3. Print the sum of the elements in `v`.

```
int sum = 0;
for (int i=0; i<int(v.size()); ++i)
    sum += v[i];
cout << sum;
```

4. Print the number of elements in `v` that are equal to 0.

```
int count = 0;
for (int i=0; i<int(v.size()); ++i)
    if (v[i] == 0)
        ++count;
cout << count;
```

5. Print the largest element in `v` (which could be negative).

```
int largest = v[0];
for (int i=1; i<int(v.size()); ++i)
    if (v[i] > largest)
        largest = v[i];
cout << largest;
```

6. Print "sorted" if and only if the elements of `v` are in decreasing order (for example {9, 8, 5, 5, -2, -3}).

```
bool sorted = true;
for (int i=1; i<int(v.size()); ++i)
    if (v[i] > v[i-1])
        sorted = false;
if (sorted)
    cout << "sorted";
```

7. Rearrange the elements of `v` so that all of the even elements are first (e.g. {8, -2, 9, 5, 5, -3}).

```
for (int i=int(v.size())-1; i>0; --i)
    for (int j=0; j<i; ++j)
        if (v[j]%2 != 0 && v[j+1]%2 == 0)
            swap(v[j], v[j+1]);
```

8. Double the size of the vector with the sequence repeated (e.g. {8, -2, 9, 5, 5, 3, 8, -2, 9, 5, 5, 3}).

```
int n = int(v.size());
for (int i=0; i<n; ++i)
    v.push_back(v[i]);
```

Which of the following statements would be legal in function `f()` below (4 pts each):

```
int f(int a, int& b, const int& c) {
    // do something
}
```

ANSWERS

- |                                |     |
|--------------------------------|-----|
| 9. <code>a = b;</code>         | yes |
| 10. <code>b = c;</code>        | yes |
| 11. <code>c = a;</code>        | no  |
| 12. <code>b = 100;</code>      | yes |
| 13. <code>return a+b+c;</code> | yes |

If `x` is an `int`, which of the following statements would be legal in `main()`? (4 pts each):

- |   |     |
|---|-----|
| 14. <code>x = f(1, 2, 3);</code>            | no  |
| 15. <code>f(x, x, x);</code>                | yes |
| 16. <code>x = f(f(x, x, x), x, x+x);</code> | yes |

17. Write a function `readline(s)` that reads a line of input into string `s` (like `getline(cin, s)`) and returns true if successful, e.g. (10 pts)

```
// copy input to output line by line
string s;
while (readline(s))
    cout << s << "\n";
```

```
// ANSWER
bool readline(string& s)
{
    return getline(cin, s);
}
```

18. Write a function that takes a `vector<double>` by const reference and returns the average of the elements (10 pts).

```
// ANSWER
double average(const vector<double>& v)
{
    double sum = 0;
    for (int i=0; i<int(v.size()); ++i)
        sum += v[i];
    return sum / int(v.size());
}
```