1. What does each of the following print? (3 points each).

ANSWERS

```
cout << 3 + 4 % 5;                          7  (4 % 5 is 4, % has precedence)
cout << 20 / 3;                             6  (integer division)
string s = "exam";  cout << s[1];           x  (array bounds start at 0)
cout << s.substr(1, 2);                     xa (start at 1, length 2)
sort(s.begin(), s.end()); cout << s;        aemx  (characters are sorted)

cout << int(s.size());                      4
int a=3, b=4; if (a=5) cout << a; else cout << b;   5 (a=5 is assignment)
cout << char(toupper('b' + b));             F  (b is 4, 'b' + 4 is 'f')
cout << b++;                                4  (then increment b to 5)
cout << '8' - '2';                          6  (not ACK, result is an int)
```

2. Write a function `tonum` that takes a string of digits and returns the corresponding number, e.g. (20 pts).
```
string s = "123";
int x = tonum(s);   // 123
```

```
//ANSWER 1
int tonum(string s)
{
  int n = 0;  // result
  for (int i=0; i<int(s.size()); ++i)  // base 10 evaluation
    n = n * 10 + (s[i] - '0');
  return n;
}

// ANSWER 2
int tonum(string s)
{
  return atoi(s.c_str());  // std::atoi is in <cstdlib>
}
```

3. Suppose `v` is a `vector<int>`. Write code to reverse the order of the elements in `v` (20 pts).

```
// ANSWER 1
for (int i=0; i < int(v.size())/2; ++i)
{
  int tmp = v[i];  // swap first and last, 2nd and 2nd to last, etc.
  v[i] = v[int(v.size()) - i - 1];
  v[int(v.size()) - i - 1] = tmp;
}

// ANSWER 2
for (int i=0; i < int(v.size())/2; ++i)
  swap(v[i], v[int(v.size()) - i - 1]);  // std::swap is in <algorithm>

// ANSWER 3
reverse(v.begin(), v.end());  // std::reverse is in <algorithm>
```

4. On the back, write the code for the two member functions of class `Person` so it works as shown (30 pts).

```
class Person
{
public:
   Person(string n, int a);   // name and age
   void print();   // prints "My name is name and I am age years old"
private:
   string name;
   int age;
};

int main()
{
   Person jj("Joe", 21);
   jj.print();   // prints "My name is Joe and I am 21 years old"
   return 0;
}


// ANSWER
Person::Person(string n, int a)   // Constructor
{
   name = n;
   age = a;
}

void Person::print()
{
   cout << "My name is " << name << " and I am " << age << " years old\n";
}
```