Instructions: This assignment is mostly concerned with arrays in C++. The answers to the following questions can be deduced from the lectures and text, but you may also want to type in and run these programs to test your reasoning. (You might also want to add some output instructions if you do that.)

Note: the phrase "illegal reference" used below refers to a reference to a location that lies outside the array in question, whether or not a syntax error (compiler error) is involved.

Select the best answer for each question and mark in on the opscan form passed out with this assignment.

For questions 1 through 3, consider the following program and determine what value is assigned to the specified array cell by the for loop.

```c
int func(int x);
void main() {
    int a[10];
    for (int i = 0; i < 10; i++)
        a[i] = func(i);
}
int func(int x) {
    return (5*x - 1);
}
```

1) `a[0]`
   a) 0     b) 1     c) 5     d) illegal reference     e) none of the above

2) `a[3]`
   a) 0     b) 14    c) 7     d) illegal reference     e) none of the above

3) `a[10]`
   a) 0     b) 7     c) 49    d) illegal reference     e) none of the above

For questions 4 through 6, consider the following program and determine what value is assigned to the indicated array location by the given initialization.

```c
void main() {
    int b[5] = {4,3,2};
}
```

4) `b[0]`
   a) 2     b) 3     c) 4     d) illegal reference     e) none of the above

5) `b[3]`
   a) 2     b) 3     c) 4     d) illegal reference     e) none of the above

6) `b[5]`
   a) 2     b) 3     c) 4     d) illegal reference     e) none of the above
For questions 7 through 11 consider the following program and determine the values stored in the array c at the indicated points in the program.

```c
void func1(int arr1[], const int arr2[], int size);
void func2(int arr1[], const int arr2[], int size);
void func3(int arr1[], const int arr2[], const int arr3[], int size);
void func4(int arr1[], const int arr2[], const int arr3[], int size);
int func5(const int arr2[], const int arr3[], int size);

void main() {
    const int size = 3;
    int a[size] = {1,2,3};
    int b[size] = {7,8,9};
    int c[size] = {0,0,0};
    int d = 0;
    func1(c, b, size);
    func2(c, a, size);
    func3(c, a, b, size);
    func4(c, a, b, size);
    d = func5(a, b, size);
}

void func1(int arr1[], const int arr2[], int size){
    for (int i = 0; i < size; i++) {
        arr1[i] = arr2[i];
    }
}

void func2(int arr1[], const int arr2[], int size){
    for (int i = 0; i < size; i++) {
        arr1[i] = 5 * arr2[i];
    }
}

void func3(int arr1[], const int arr2[], const int arr3[], int size){
    for (int i = 0; i < size; i++) {
        arr1[i] = arr2[i] + arr3[i];
    }
}

void func4(int arr1[], const int arr2[], const int arr3[], int size){
    for (int i = 0; i < size; i++) {
        arr1[i] = arr2[i] * arr3[i];
    }
}

int func5(const int arr2[], const int arr3[], int size){
    int val = 0;
    for (int i = 0; i < size; i++) {
        val += arr2[i] * arr3[i];
    }
    return val;
}
```

7) after the call to `func1`

   a) \{0,0,0\}   b) \{1,2,3\}   c) \{7,8,9\}   d) \{8,10,12\}   e) none of the above
8) after the call to `func2`  
   a) {0,0,0}   b) {1,2,3}   c) {5,10,15}   d) {8,10,12}   e) none of the above

9) after the call to `func3`  
   a) {0,0,0}   b) {1,2,3}   c) {7,8,9}   d) {8,10,12}   e) none of the above

10) after the call to `func4`  
   a) {0,0,0}   b) {1,2,3}   c) {7,8,9}   d) {7,16,27}   e) none of the above

11) What value is assigned to the variable `d` after the call to `func5`?  
   a) 0   b) 40   c) 50   d) 60   e) none of the above

For questions 12 through 21 consider writing a program that contains the following prototype and declarations. Indicate whether the statement given in each question is allowed (syntactically legal, no compiler error) in C++. Be careful with this one – the question is about official ANSI C/C++ and assumes that your program does not do any operator overloading.

```c++
const int size = 3;
void DoSomething(int a[], int length);
int first[size] = {1, 2, 3},
    second[size] = {8, 9, 10},
    third[size] = {-4, -2, -1};
```

12) `third = first;`  
   a) yes, syntax is legal  
   b) no, syntax is illegal

13) `third = first + second;`  
   a) yes, syntax is legal  
   b) no, syntax is illegal

   a) yes, syntax is legal  
   b) no, syntax is illegal

15) `third[0] = first[1] + second[2];`  
   a) yes, syntax is legal  
   b) no, syntax is illegal

16) `DoSomething(first, size);`  
   a) yes, syntax is legal  
   b) no, syntax is illegal

17) `DoSomething(first[3], size);`  
   a) yes, syntax is legal  
   b) no, syntax is illegal

18) `DoSomething(first, 2);`  
   a) yes, syntax is legal  
   b) no, syntax is illegal

19) `cin >> first;`  
   a) yes, syntax is legal  
   b) no, syntax is illegal

20) `cout << third[2];`  
   a) yes, syntax is legal  
   b) no, syntax is illegal

21) `third[0] = second[first[1]];`  
   a) yes, syntax is legal  
   b) no, syntax is illegal
22) The program below attempts to create an array to read input from the user, who will enter the number of values to be read and then enter those values. If there is a syntax error or other error in the program, indicate where it occurs. If not, mark none of the above.

```cpp
#include <iostream.h> // line 1

void main() { // line 2
    int n; // line 3
    cin >> n; // line 4
    int values[n]; // line 5
    for (int i = 0; i < n; i++) { // line 6
        cin >> values[i]; // line 7
    }
}
```

a) line 1  b) line 2  c) line 3  d) line 4  e) line 5
f) line 6  g) line 7  h) more than one line has an error  i) none of the above

23) The function below is intended to print the all values in the array parameter `sequence`, one per line. If there is a logic error in the function, indicate where it occurs. If not, mark none of the above.

```cpp
void PrintList(const int sequence[ ], int length) { // line 1
    for (int i = 0; i <= length; i++) { // line 2
        cout << sequence[i]; // line 3
    }
}
```

a) line 1  b) line 2  c) line 3  d) more than one line has an error  e) none of the above

For questions 24 and 25, assume the following declarations are in effect:

```cpp
char firstLine[40] = "A loaf of bread, a jug of wine";
char secondLine[40] = "and thou";
```

and suppose the following statements are executed:

```cpp
strcat(firstLine, secondLine);
int HowBig = strlen(secondLine);
```

24) What is now stored in the array `firstLine`?

a) and thou  b) A loaf of bread, a jug of wine  c) A loaf of bread, a jug of wine and thou  d) One of the statements is illegal.  e) none of the above

25) What is the value of the variable `HowBig`?

a) 0  b) 30  c) 8  d) 31  e) 9  f) none of the above