C++ Program Design/3e
Chapter 6
Answers to Self-Check Exercises

1. answer: Any function whose type is not void must use it. A type void function may use it, but no expression is allowed to follow the word "return".

2. answer: The function cannot modify the actual parameter since it was passed by value and the function is using a copy of it.

3. answer:

```
bool nor(bool a, bool b) {
   if (!a && !b)
      return true;
   else
      return false;
}
```

4. answer:

```
float avg (int a, int b) {
   return ( (a + b)/(float) 2);
}
```

5. answer:

```
int Compare(int a, int b) {
   if (a < b)
      return -1;
   else if (a == b)
      return 0;
   else
      return 1;
}
```

6. answer:

```
10 12
3 12
4 11
4 13
```

7. answer:

```
b = 3
a = 2
a = 0
b = 4
b = 3
```

8. answer:

```
b = 3
a = 0
a = 0
b = 4
b = 3
```

9. answer:

```
#include <iostream>
#include <cmath>
using namespace std;

float calculateQ(float);  // function prototype

int main() {
   float guess, flow, diff;
   cout << "Enter a guess for the depth: ";
   cin >> guess;
   flow = calculateQ(guess);
   diff = (flow - 1000);
   while (fabs(diff) > .001) {
      if (diff < 0)
         cout << "Enter a slightly higher depth: ";
      else
         cout << "Enter a slightly lower depth: ";
      cin >> guess;
      flow = calculateQ(guess);
      diff = (flow - 1000);
   }
   cout << "\nWhen 1000 cubic feet per second of water is "
        << "\nflowing through the channel, the depth of the "
        << "\nwater is approximately " << guess << " feet."
        << endl;
   return 0;
}

float calculateQ(float d) {
   float hydraulicRadius = (d*15)/(2.0*d+15);
   return (1.49/.014)*15*d*pow(hydraulicRadius,2./3)*sqrt(.0015);
}
```

10. answer:

```
void f(int &n);
```

11. answer:

```
x is 10
y is 20
```

12. answer:

```
5 5
```

13. answer:

```
7
x is: 4 and y is: 4
z is 9 and x is: 5
```

14. answer:

first time

main		funny	
x	4	a	&x
y	4	b	7
z	5	c	7

second time

main		funny	
x	5	a	&x
y	4	b	9
z	5	c	9

15. answer:

By extracting data from a stream or inserting data into a stream, we are changing the stream, and this change must be reflected in the stream object.

16. answer:

Presumably, we want to change the object being passed, namely the SimpleWindow.

17. answer:

```
void ZeroSmaller(int &a, int &b) {
   if (fabs(a) < fabs(b))
      a = 0;
   else
      b=0;
   return;
}
```

18. answer: Its parameter list.

19. answer: The determination of what function to invoke when more than one function has the same name.

20. answer: 2

21. answer: -1

22. answer:

```
b is 5
a is 3
a is 3
b is 5
```

23. answer:

Two semicolons are missing. If these are put in, the program will still not compile because of the redefinition of a default parameter. See the blue box, page 323.

24. answer: 3

25. answer:

```
void reverse(string s, string &r) {
   int i = s.size()-1;
   r = r + s.substr(i,1);
   s = s.substr(0,s.size()-1);
   if (s.size() > 0)
      reverse(s,r);
}
```

26. answer:

```
void PrintNumber(int n) {
   if (n/10 != 0) {
      PrintNumber(n/10);
      cout << n%10;
   }
   else
      cout << n;
}
```