

1. Mark the following statements as true or false.

- a. An identifier can be any sequence of digits and letters. **False**
- b. In C++, there is no difference between a reserved word and a predefined identifier. **False**
- c. A C++ identifier can start with a digit. **False**
- d. The operands of the modulus operator must be integers. **True**
- e. If $a = 4$; and $b = 3$; then after the statement $a = b$; the value of b is still 3. **True**
- f. In the statement $\text{cin} \gg y$; y can only be an int or a double variable. **False**
- g. In an output statement, the newline character may be a part of the string. **True**
- h. The following is a legal C++ program: **True**

```
int main()  
{  
return 0;  
}
```
- i. In a mixed expression, all the operands are converted to floating-point numbers. **False**
- j. Suppose $x = 5$. After the statement $y = x++$; executes, y is 5 and x is 6. **True**
- k. Suppose $a = 5$. After the statement $++a$; executes, the value of a is still 5 because the value of the expression is not saved in another variable. **False**

2. Which of the following are valid C++ identifiers?

- a. `firstCPPProject`
- b. `POP QUIZ`
- c. `C++Program2`
- d. `quiz7`
- e. `Update`
- f. `3feetIn1Yard`
- g. `Mike'sFirstAttempt`
- h. `Update`
- i. `4th`
- j. `New_Student`

3. Which of the following is a reserved word in C++?

- a. `const`
- b. `include`
- c. `char`
- d. `void`
- e. `int`
- f. `return`

4. What is the difference between a keyword and a user-defined identifier?

- **Keywords are reserved words that cannot be redefined within a program. An identifier is something that is user-defined. It's the name of a variable that holds data or the name of a function that does a specific task.**

5. Are the identifiers `firstName` and `FirstName` the same?

- **C++ is case sensitive. The first letter of `firstName` is a lowercase `f`, whereas the first character of `FirstName` is an uppercase `F`. These two are different.**

6. Evaluate the following expressions:

9. Do a walk-through to find the value assigned to e. Assume that all variables are properly declared.

a = 3;

b = 4;

c = (a % b) * 6;

d = c / b;

e = (a + b + c + d) / 4; = 7

10. Which of the following variable declarations are correct? If a variable declaration is not correct, give the reason(s) and provide the correct variable declaration.

55 = age;	//Line 1	int age = 55;
char letter = ' ';	//Line 2	char letter;
string message = 'First test is on Monday Monday';	//Line 3	string message = "First test is on Monday";
int one = 5;	//Line 4	
int prime;	//Line 5	
double x, y, z;	//Line 6	

11. Which of the following are valid C++ assignment statements? Assume that i, x, and percent are double variables.

a. i = i + 5; b. x + 2 = x; c. x = 2.5 * x; d. percent = 10%;

12. Write C++ statement(s) that accomplish the following:

- Declare in variables x and y. Initialize x to 25 and y to 18.
- Declare and initialize an in variable temp to 10 and a char variable ch to 'A'.
- Update the value of an in variable x by adding 5 to it.
- Declare and initialize a double variable payRate to 12.50.
- Copy the value of an in variable firstNum into an in variable tempNum.
- Swap the contents of the in variables x and y. (Declare additional variables, if necessary.)
- Suppose x and y are double variables. Output the contents of x, y, and the expression $x + 12 / y - 18$.
- Declare a char variable grade and set the value of grade to 'A'.
- Declare in variables to store four integers.
- Copy the value of a double variable z to the nearest integer into an in variable x.

- ```

int x=25;
int y=18;

int temp = 10;

char ch = 'A';

x = x+ 5; or x+=5

double payRate = 12.50;

tempNum = firstNum;

// #include <algorithm>

std::swap(x, y);

// #include <iostream>

std::cout << x << y << x + 12/ y - 8 << std::endl;

char grade = 'A'

int num1, num2, num3, num4;

x = z;

```

13. Write each of the following as a C++ expression:

- 32 times a plus b -  $32 * a + b$
- The character that represents 8 - `'8'`
- The string that represents the name Julie Nelson. - `"JulieNelson"`
- $(b^2 - 4ac) / 2a$  -  $(b*b-4*a*c) / (2*a)$
- $(a + b)/c(e f)-gh$  -  $(a+b) / c * (e*f) - g*h$
- $(-b + (b^2 - 4ac)) / 2a$  -  $(-b+(b*b-4*a*c)) / (2*a)$

14. Suppose x, y, z, and w are in variables. What value is assigned to each of these variables after the last statement executes?

- ```

x = 4; y = 11;

z = y - 2 * x;    z = 3

x = z + y;       x = 14

```

$$y = x + 5 * z; \quad y = 29$$

$$w = x - y + 2 * z; \quad w = -9$$

$$x = y + w - x; \quad x = 6$$

$$-w; \quad w = 9$$

15. Suppose x, y, and z are in variables and w and t are double variables. What value is assigned to each of these variables after the last statement executes?

$$x = 23;$$

$$y = 35; \quad y=35$$

$$x = x + y / 4 - 3; \quad x=28$$

$$z = x \% 3; \quad z=1$$

$$w = 28 / 3 + 6.5 * 2; \quad w= 22.0$$

$$t = x / 4.0 + 15 \% 4 - 3.5; \quad t=6.5$$

16. Suppose x, y, and z are in variables and x = 2, y = 5, and z = 6. What is the output of each of the following statements?

$$a. \text{ cout } \ll "x = " \ll x \ll ", y = " \ll y \ll ", z = " \ll z \ll \text{ endl}; \quad x=2,y=5,z=6$$

$$b. \text{ cout } \ll "x + y = " \ll x + y \ll \text{ endl}; \quad x+y=7$$

$$c. \text{ cout } \ll "Sum of " \ll x \ll " and " \ll z \ll " is " \ll x + z \ll \text{ endl}; \quad \text{Sum of 2 and 6 is 8}$$

$$d. \text{ cout } \ll "z / x = " \ll z / x \ll \text{ endl}; \quad z/x=3$$

$$e. \text{ cout } \ll "2 \text{ times } " \ll x \ll " = " \ll 2 * x \ll \text{ endl}; \quad 2 \text{ times } 2 = 4$$

17. What is the output of the following statements? Suppose a and b are in variables, c is a double variable, and a = 13, b = 5, and c = 17.5.

$$a. \text{ cout } \ll a + b - c \ll \text{ endl}; \quad =.50$$

$$b. \text{ cout } \ll 15 / 2 + c \ll \text{ endl}; \quad =24.50$$

$$c. \text{ cout } \ll a / \text{static_cast}<\text{double}>(b) + 2 * c \ll \text{ endl}; \quad =37.6$$

$$d. \text{ cout } \ll 14 \% 3 + 6.3 + b / a \ll \text{ endl}; \quad =8.3$$

$$e. \text{ cout } \ll \text{static_cast}<\text{in}>(c) \% 5 + a - b \ll \text{ endl}; \quad =10$$

$$f. \text{ cout } \ll 13.5 / 2 + 4.0 * 3.5 + 18 \ll \text{ endl}; \quad =38.75$$

18. Write C++ statements that accomplish the following:

- Output the newline character.
- Output the tab character.
- Output double quotation mark.

- a. `cout << "The newline escape sequence is \n" << endl;`
- b. `cout << "The tab character is represented as \\t" << endl;`
- c. `cout << "The string \"Sunny\" contains five characters." << endl;`

19. Which of the following are correct C++ statements?

- a. `cout << "Hello There!" << endl;`
- b. `cout << "Hello"; << " There!" << endl;`
- c. `cout << "Hello" << " There!" << endl;`
- d. `cout << 'Hello There!' << endl;`

20. Give meaningful identifiers for the following variables:

- a. A variable to store the first name of a student. `string firstNameStudent`
- b. A variable to store the discounted price of an item. `double discountPrice;`
- c. A variable to store the number of juice bottles. `int numJuiceBottles`
- d. A variable to store the number of miles traveled. `double numMilesTraveled`
- e. A variable to store the highest test score. `double highTestScore`

21. Write C++ statements to do the following:

- a. Declare in variable num1 and num2. `int num1;`
`int num2;`
- b. Prompt the user to input two numbers. `Cout<< "Enter two numbers separated by spaces."<<endl;`
- c. Input the first number in num1 and the second number in num2. `cin >> num1 >> num2;`
- d. Output num1, num2, and 2 times num1 minus num2. Your output must identify each number and the expression. `cout << "num1 = " << num1 << "num2 = " << num2 << "2 * num1 - num2 = " << 2 * num1 - num2 << endl;`

22. The following program has syntax errors. Correct them. On each successive line, assume that any preceding error has been corrected.

```
#include <io_stream>

const in TOP_NUM = 753,409;

const PAY_RATE = 18.35
```

```

main() int
{
int testScore, projectScore;

double temp;

double payCheck

testScore = 88;

projectScore = 22;

cout << testScore << " " << projectScore << endl;

temp = 82;

newTemp = testScore + 2 * projectScore;

first = 2 * TOP_NUM;

TOP_NUM = TOP_NUM - 919;

cout << first << " " TOP_NUM << endl;

paycheck = hoursWorked * PAY_RATE

cout << "Wages = " << paycheck << endl;

return 0;

}

```

- `#include <iostream>`
`using namespace std;`
`const int TOP_NUM = 753409;`
`const double PAY_RATE = 18.35;`
`int main()`
`{`
`int testScore, projectScore;`
`double temp;`
`double paycheck;`
`double hoursWorked = 40;`

```

testScore = 88;
projectScore = 22;

cout << testScore << " " << projectScore << endl;
temp = 82;
int newTemp = testScore + 2 * projectScore;
int first = 2 * TOP_NUM;
TOP_NUM = TOP_NUM - 919;
cout << first << " " << TOP_NUM << endl;
paycheck = hoursWorked * PAY_RATE
cout << "Wages = " << paycheck << endl;
return 0;
}

```

23. The following program has syntax mistakes. Correct them. On each successive line, assume that any preceding error has been corrected.

```

cost char = STAR = '*'
cost in PRIME = 71;
in main
{
in count, sum;
double x;
count = 1;
sum = count + PRIME;
x := 25.67;
newNum = count * ONE + 2;
sum + count = sum; x = x + sum * COUNT;
cout << " count = " << count << ", sum = " << sum

```

```
<< ", PRIME = " << Prime << endl;
}
```

- `#include <iostream>`
`using namespace std;`
`const char STAR = '*'; const int PRIME = 71;`
`int main()`
`{`
`int count, sum; double x;`
`int newNum; //declare newNum`
`count = 1;`
`sum = count + PRIME;`
`x = 25.67; // x = 25.67;`
`newNum = count * 1 + 2; //newNum = count * ONE + 2;`
`sum = sum + count; //sum + count = sum;`
`x = x + sum * count; // x = x + sum * COUNT;`
`cout << " count = " << count << ", sum = " << sum`
`<< ", PRIME = " << PRIME << endl;`
`return 0;`
`}`

24. The following program has syntax errors. Correct them. On each successive line, assume that any preceding error has been corrected.

```
#include <iostream>
using namespace std;
int main()
{
    int temp;
    string first;
    cout << "Enter first name: ;
```

```
cin >> first cout << endl;
cout << "Enter last name: ";
cin >> last; cout << endl;

cout << "Enter today's temperature: ";
cin >> temperature;
cout << endl;
cout << first << " " << last << "today's temperature is: ";
<< temperature << endl;
return 0;
}
```

```
#include <iostream>
```

```
using namespace std;
int main()
{
int temp;
string first, last;
cout << "Enter first name: ";
cin >> first; cout << endl;
cout << "Enter last name: ";
cin >> last; cout << endl;

cout << "Enter today's temperature: ";
cin >> temp;
cout << endl;
cout << first << " " << last << "today's temperature is: " << temp << endl;
return 0;
}
```

25. What action must be taken before a variable can be used in a program?

- An identifier must be declared before it can be used.

26. Preprocessor directives begin with which of the following symbols:

- a. * b. # c. \$ d. ! e. None of these.

27. Write equivalent compound statements if possible.

- a. $x = 2 * x$ $x *= 2;$
b. $x = x + y - 2;$ $x += y - 2;$
c. $sum = sum + num;$ $sum += sum;$
d. $z = z * x + 2 * z;$ $z *= x + 2;$
e. $y = y / (x + 5);$ $y /= x + 5;$

28. Write the following compound statements as equivalent simple statements.

- a. $x += 5 - z;$ b. $y *= 2 * x + 5 - z;$ c. $w += 2 * z + 4;$ d. $x -= z + y - t;$ e. $sum += num;$
a. $x = x + 5 - z;$ b. $y = y * (2 * x + 5 - z);$ c. $w = w + 2 * z + 4;$ d. $x = x - (z + y - t);$ e. $sum = sum +$

num

29. Suppose a, b, and c are in variables and a = 5 and b = 6. What value is assigned to each variable after each statement executes? If a variable is undefined at a particular statement, report UND (undefined).

- | | a | b | c |
|--------------------------|----|----|-----|
| $a = (b++) + 3;$ | 9 | 7 | UND |
| $c = 2 * a + (++b);$ | 9 | 8 | 26 |
| $b = 2 * (++c) - (a++);$ | 10 | 45 | 27 |

30. Suppose a, b, and sum are in variables and c is a double variable. What value is assigned to each variable after each statement executes? Suppose a = 3, b = 5, and c = 14.1.

- | | a | b | c | sum |
|--------------------|----|---|------|-----|
| $sum = a + b + c;$ | 3 | 5 | 14.1 | 22 |
| $c /= a;$ | 3 | 5 | 4.7 | 22 |
| $b += c - a;$ | 3 | 6 | 4.7 | 22 |
| $a *= 2 * b + c;$ | 50 | 6 | 4.7 | 22 |

31. What is printed by the following program? Suppose the input is:

20 15

```
#include <iostream>
using namespace std;
const int NUM = 10;
const double X = 20.5;
int main()
{
    int a, b;
    double z;
    char grade;
    a = 25;
    cout << "a = " << a << endl;
    cout << "Enter two integers: "; cin >> a >> b; cout << endl;
    cout << "The numbers you entered are " << a << " and " << b << endl;
    z = X + 2 * a - b; cout << "z = " << z << endl;
    grade = 'A';
    cout << "Your grade is " << grade << endl;
    a = 2 * NUM + z;
    cout << "The value of a = " << a << endl;
    return 0;
}
```

(The user input is shaded.)

a = 25 Enter two integers : 20 15

The numbers you entered are 20 and 15 z = 45.5

Your grade is A The value of a = 65

32. What is printed by the following program? Suppose the input is:

Miller

34

340

```

#include <iostream> #include <string>
using namespace std;
const int PRIME_NUM = 11;
int main()
{
    const int SECRET = 17;
    string name;
    int id; int num;
    int mysteryNum;
    cout << "Enter last name: ";
    cin >> name;
    cout << endl;
    cout << "Enter a two digit number: ";
    cin >> num; cout << endl;
    id = 100 * num + SECRET;
    cout << "Enter a positive integer less than 1000: ";
    cin >> num;
    cout << endl;
    mysteryNum = num * PRIME_NUM - 3 * SECRET;
    cout << "Name: " << name << endl;
    cout << "Id: " << id << endl;
    cout << "Mystery number: " << mysteryNum << endl;
    return 0;
}

```

- Enter last name: Miller
Enter a two digit number: 34
Enter a positive integer less than 1000: 340
Name: Miller
Id: 3417

Mystery number: 323

33. Rewrite the following program so that it is properly formatted.

```
#include <iostream>
#include <string>
using namespace std;
cost double X = 13.45;
cost in Y=34;
cost char BLANK= ' ';
in main()
{string firstName,lastName;int num;
double salary;
cout<<"Enter first name: "; cin>> firstName; cout<<endl;
cout<<"Enter last name: "; cin
>>lastName;cout<<endl;
    cout<<"Enter a positive integer less than 70:";
cin>>num;cout<<endl; salary=num*X;
cout<<"Name: "<<firstName<<BLANK<<lastName<<endl;cout
<<"Wages: $"<<salary<<endl; cout<<"X = "<<X<<endl;
cout<<"X+Y = " << X+Y << endl; return 0;
}
```

- #include <iostream>
#include <string>
using namespace std;
cost double X = 13.45;
cost in Y = 34; cost char BLANK = ' ';
in main()
{
string firstName, lastName;

```

in num; double salary;
cout << "Enter first name: ";
cin >> firstName; cout << endl;
cout << "Enter last name: ";
cin >> lastName;
cout << endl;
cout << "Enter a positive integer less than 70: ";
cin >> num;
cout << endl;
salary = num * X;
cout << "Name: " << firstName << BLANK << lastName << endl;
cout << "Wages: $" << salary << endl;
cout << "X = " << X << endl;
cout << "X + Y = " << X + Y << endl;
return 0;
}

```

34. What type of input does the following program require, and in what order does the input need to be provided?

```

#include <iostream>
using namespace std;
in main()
{
    in invoiceNumber;
    double salesTaxRate;
    double productPrice;
    string productName;

    cin >> productName;
    cin >> salesTaxRate >> productPrice;

```

```
cin >> invoiceNumber;
```

```
return 0;
```

```
}
```

```
User input, invoiceNumber, productName, productPrice, salesTaxRate.
```