# Review Questions

## Multiple Choice

1. A _____ error does not prevent the program from running, but causes it to produce incorrect results.
   a. syntax
   b. hardware
   c. logic
   d. fatal

2. A _____ is a single function that the program must perform in order to satisfy the customer.
   a. task
   b. software requirement
   c. prerequisite
   d. predicate

3. A(n) _____ is a set of well-defined logical steps that must be taken to perform a task.
   a. logarithm
   b. plan of action
   c. logic schedule
   d. algorithm

4. An informal language that has no syntax rules and is not meant to be compiled or executed is called _____.
   a. faux code
   b. pseudocode
   c. Python
   d. a flowchart

5. A _____ is a diagram that graphically depicts the steps that take place in a program.
   a. flowchart
   b. step chart
   c. code graph
   d. program graph

6. A _____ is a sequence of characters.
   a. char sequence
   b. character collection
   c. string
   d. text block

7. A _____ is a name that references a value in the computer's memory.
   a. variable
   b. register
   c. RAM slot
   d. byte

8. A _____ is any hypothetical person using a program and providing input for it.
   a. designer
   b. user
   c. guinea pig
   d. test subject

9. A string literal in Python must be enclosed in _____.
   a. parentheses.
   b. single-quotes.
   c. double-quotes.
   d. either single-quotes or double-quotes.

10. Short notes placed in different parts of a program explaining how those parts of the program work are called _____.
   a. comments
   b. reference manuals
   c. tutorials
   d. external documentation

11. A(n) _____ makes a variable reference a value in the computer's memory.
   a. variable declaration
   b. assignment statement
   c. math expression
   d. string literal

12. This symbol marks the beginning of a comment in Python.
   a. &
   b. *
   c. **
   d. #

13. Which of the following statements will cause an error?
   a. x = 17
   b. 17 = x
   c. x = 99999
   d. x = '17'

14. In the expression 12 + 7, the values on the right and left of the + symbol are called _____.
   a. operands
   b. operators
   c. arguments
   d. math expressions

15. This operator performs integer division.
   a. //
   b. %
   c. **
   d. /

16. This is an operator that raises a number to a power.
   a. %
   b. *
   c. **
   d. /

17. This operator performs division, but instead of returning the quotient it returns the remainder.
   a. %
   b. *
   c. **
   d. /

18. Suppose the following statement is in a program: price = 99.0. After this statement executes, the price variable will reference a value of which data type?
    a. int
    b. float
    c. currency
    d. str

19. Which built-in function can be used to read input that has been typed on the keyboard?
    a. input()
    b. get_input()
    c. read_input()
    d. keyboard()

20. Which built-in function can be used to convert an int value to a float?
    a. int_to_float()
    b. float()
    c. convert()
    d. int()

21. A magic number is _____.
    a. a number that is mathematically undefined
    b. an unexplained value that appears in a program's code
    c. a number that cannot be divided by 1
    d. a number that causes computers to crash

22. A _____ is a name that represents a value that does not change during the program's execution.
    a. named literal
    b. named constant
    c. variable signature
    d. key term

**True or False**

1. Programmers must be careful not to make syntax errors when writing pseudocode programs.
2. In a math expression, multiplication and division take place before addition and subtraction.
3. Variable names can have spaces in them.
4. In Python, the first character of a variable name cannot be a number.
5. If you print a variable that has not been assigned a value, the number 0 will be displayed.

**Short Answer**

1. What does a professional programmer usually do first to gain an understanding of a problem?
2. What is pseudocode?
3. Computer programs typically perform what three steps?
4. If a math expression adds a float to an int, what will the data type of the result be?
5. What is the difference between floating-point division and integer division?
6. What is a magic number? Why are magic numbers problematic?

7. Assume a program uses the named constant PI to represent the value 3.14159. The program uses the named constant in several statements. What is the advantage of using the named constant instead of the actual value 3.14159 in each statement?

## Algorithm Workbench

1. Write Python code that prompts the user to enter his or her height and assigns the user's input to a variable named height.

2. Write Python code that prompts the user to enter his or her favorite color and assigns the user's input to a variable named color.

3. Write assignment statements that perform the following operations with the variables a, b, and c:
   a. Adds 2 to a and assigns the result to b
   b. Multiplies b times 4 and assigns the result to a
   c. Divides a by 3.14 and assigns the result to b
   d. Subtracts 8 from b and assigns the result to a

4. Assume the variables result, w, x, y, and z are all integers, and that w = 5, x = 4, y = 8, and z = 2. What value will be stored in result after each of the following statements execute?
   a. result = x + y
   b. result = z * 2
   c. result = y / x
   d. result = y - z
   e. result = w // z

5. Write a Python statement that assigns the sum of 10 and 14 to the variable total.

6. Write a Python statement that subtracts the variable down_payment from the variable total and assigns the result to the variable due.

7. Write a Python statement that multiplies the variable subtotal by 0.15 and assigns the result to the variable total.

8. What would the following display?
```
a = 5
b = 2
c = 3
result = a + b * c
print(result)
```

9. What would the following display?
```
num = 99
num = 5
print(num)
```

10. Assume the variable sales references a float value. Write a statement that displays the value rounded to two decimal points.

11. Assume the following statement has been executed:
```
number = 1234567.456
```
Write a Python statement that displays the value referenced by the number variable formatted as
```
1,234,567.5
```

12. What will the following statement display?
```
print('George', 'John', 'Paul', 'Ringo', sep='@')
```

13. Write a turtle graphics statement that draws a circle with a radius of 75 pixels.

14. Write the turtle graphics statements to draw a square that is 100 pixels wide on each side and filled with the color blue.

15. Write the turtle graphics statements to draw a square that is 100 pixels wide on each side and a circle that is centered inside the square. The circle's radius should be 80 pixels. The circle should be filled with the color red. (The square should not be filled with a color.)

## Programming Exercises

### 1. Personal Information

Write a program that displays the following information:

- Your name
- Your address, with city, state, and ZIP
- Your telephone number
- Your college major

### 2. Sales Prediction

VideoNote
The Sales
Prediction Problem

A company has determined that its annual profit is typically 23 percent of total sales. Write a program that asks the user to enter the projected amount of total sales, then displays the profit that will be made from that amount.

*Hint: Use the value 0.23 to represent 23 percent.*

### 3. Land Calculation

One acre of land is equivalent to 43,560 square feet. Write a program that asks the user to enter the total square feet in a tract of land and calculates the number of acres in the tract.

*Hint: Divide the amount entered by 43,560 to get the number of acres.*

### 4. Total Purchase

A customer in a store is purchasing five items. Write a program that asks for the price of each item, then displays the subtotal of the sale, the amount of sales tax, and the total. Assume the sales tax is 7 percent.

### 5. Distance Traveled

Assuming there are no accidents or delays, the distance that a car travels down the interstate can be calculated with the following formula:

$$Distance = Speed \times Time$$

A car is traveling at 70 miles per hour. Write a program that displays the following:

- The distance the car will travel in 6 hours
- The distance the car will travel in 10 hours
- The distance the car will travel in 15 hours

### 6. Sales Tax

Write a program that will ask the user to enter the amount of a purchase. The program should then compute the state and county sales tax. Assume the state sales tax is 5 percent and the county sales tax is 2.5 percent. The program should display the amount of the

purchase, the state sales tax, the county sales tax, the total sales tax, and the total of the sale (which is the sum of the amount of purchase plus the total sales tax).

*Hint: Use the value 0.025 to represent 2.5 percent, and 0.05 to represent 5 percent.*

## 7. Miles-per-Gallon

A car's miles-per-gallon (MPG) can be calculated with the following formula:

$$MPG = Miles\ driven \div Gallons\ of\ gas\ used$$

Write a program that asks the user for the number of miles driven and the gallons of gas used. It should calculate the car's MPG and display the result.

## 8. Tip, Tax, and Total

Write a program that calculates the total amount of a meal purchased at a restaurant. The program should ask the user to enter the charge for the food, then calculate the amounts of a 18 percent tip and 7 percent sales tax. Display each of these amounts and the total.

## 9. Celsius to Fahrenheit Temperature Converter

Write a program that converts Celsius temperatures to Fahrenheit temperatures. The formula is as follows:

$$F = \frac{9}{5}C + 32$$

The program should ask the user to enter a temperature in Celsius, then display the temperature converted to Fahrenheit.

## 10. Ingredient Adjuster

A cookie recipe calls for the following ingredients:

- 1.5 cups of sugar
- 1 cup of butter
- 2.75 cups of flour

The recipe produces 48 cookies with this amount of the ingredients. Write a program that asks the user how many cookies he or she wants to make, then displays the number of cups of each ingredient needed for the specified number of cookies.

## 11. Male and Female Percentages

Write a program that asks the user for the number of males and the number of females registered in a class. The program should display the percentage of males and females in the class.

*Hint: Suppose there are 8 males and 12 females in a class. There are 20 students in the class. The percentage of males can be calculated as $8 \div 20 = 0.4$, or 40%. The percentage of females can be calculated as $12 \div 20 = 0.6$, or 60%.*

## 12. Stock Transaction Program

Last month, Joe purchased some stock in Acme Software, Inc. Here are the details of the purchase:

- The number of shares that Joe purchased was 2,000.
- When Joe purchased the stock, he paid $40.00 per share.
- Joe paid his stockbroker a commission that amounted to 3 percent of the amount he paid for the stock.

Two weeks later, Joe sold the stock. Here are the details of the sale:

- The number of shares that Joe sold was 2,000.