# *Starting Out with Python, 5th Edition*

# Answers to Review Questions

## Chapter 1

### Multiple Choice

1. b
2. a
3. d
4. b
5. c
6. a
7. c
8. b
9. a
10. a
11. d
12. b
13. c
14. b
15. c
16. a
17. b
18. d
19. b
20. b
21 c
22. a
23. d
24. a
25. b

### True or False

1. False
2. True
3. True
4. False
5. True
6. False
7. True
8. False
9. False
10. False

### Short Answer

1. Because without it, the computer could not run software.

2. A bit that is turned on represents 1, and a bit that is turned off represents 0.

3. A digital device

4. Keywords

5. Mnemonics

6. A compiler is a program that translates a high-level language program into a separate machine language program. The machine language program can then be executed any time it is needed. An interpreter is a program that both translates and executes the instructions in a high-level language program. As the interpreter reads each individual instruction in the program, it converts it to a machine language instruction and then immediately executes it. Because interpreters combine translation and execution, they typically do not create separate machine language programs.

7. Operating system

**Exercises**

1. *No solution -- This is a hands-on exercise to help you learn how to work with the Python interpreter in interactive mode.*

2. *No solution -- This is a hands-on exercise to help you learn how to work with the IDLE programming environment.*

3.

| Decimal | Binary |
|---|---|
| 11 | 1011 |
| 65 | 1000001 |
| 100 | 1100100 |
| 255 | 11111111 |

4.

| Binary | Decimal |
|---|---|
| 1101 | |
| 13 | |
| 1000 | |
| 8 | |
| 101011 | 43 |

5. Here is an example: The ASCII codes for the name Marty are:

```
M =  77
a =  97
r = 114
t = 226
y = 121
```

6.

- Guido van Rossum is the creator of the Python programming language.
- Python was created in the late 1980s.
- Benevolent Dictator for Life

# Chapter 2

**Multiple Choice**

1. c
2. b
3. d
4. b
5. a
6. c
7. a
8. b
9. d
10. a
11. b
12. d
13. b
14. a
15. a
16. c
17. a
18. b
19. a
20. b
21. b
22. b

**True or False**

1. False
2. True
3. False
4. True
5. False

**Short Answer**

1 Interview the customer

2. An informal language that has no syntax rules, and is not meant to be compiled or executed. Instead, programmers use pseudocode to create models, or "mock-ups" of programs.

3. (1) Input is received.
(2) Some process is performed on the input.
(3) Output is produced.

4. `float`

5. Floating point division returns a floating point number that may include fractions. Integer division returns an integer and ignores any fractional part of the division result.

6. A magic number is an unexplained value that appears in a program's code. Magic numbers can be problematic, for a number of reasons. First, it can be difficult for someone reading the code to determine the purpose of the number. Second, if the magic number is used in multiple places in the program, it can take painstaking effort to change the number in each location, should the need arise. Third, you take the risk of making a typographical mistake each time you type the magic number in the program's code.

7. The named constant makes the program more self-explanatory. In a math statement, it is evident that `PI` represents the value of pi. Another advantage to using the named constant is that widespread changes can easily be made to the program. Let's say the value of pi appears in several different statements throughout the program. If you need to change the number of decimal places of precision used with the number, the initialization value in the declaration of the named constant is the only value that needs to be modified. For example, to use only two decimal places of precision, the declaration can be changed to:

```
PI = 3.14
```

The new value of 3.14 will then be used in each statement that includes the `PI` constant. Another advantage to using the named constant is that it helps to prevent the typographical errors that are common when using magic numbers. For example, if you accidentally type 31.4159 instead of 3.14159 in a math statement, the program will calculate the wrong value. However, if you misspell `PI`, the Python interpreter will display a message indicating that the name is not defined.

**Algorithm Workbench**

1. 
```
height = int(input('Enter your height: '))
```

2. 
```
color = input('Enter your favorite color: ')
```

3. 
a. 
```
b = a + 2
```
b. 
```
a = b * 4
```
c. 
```
b = a / 3.14
```
d. 
```
a = b - 8
```

4. a. 12
b. 4
c. 2
d. 6
e. 2

5. 
```
total = 10 + 14
```

6. 
```
due = total - down_payment
```

7. 
```
total = subtotal * 0.15
```

8. 11

9. 5

10. `print(f'{sales:.2f}')`

11. `print(f'{number:,.1f}')`

12. `George@John@Paul@Ringo`

13. `turtle.circle(75)`

14. 
```
turtle.fillcolor('blue')
turtle.begin_fill()
turtle.forward(100)
turtle.left(90)
turtle.forward(100)
turtle.left(90)
turtle.forward(100)
turtle.left(90)
turtle.forward(100)
turtle.end_fill()
```

15. 
```
turtle.forward(100)
turtle.left(90)
turtle.forward(100)
turtle.left(90)
turtle.forward(100)
turtle.left(90)
turtle.forward(100)
turtle.penup()
turtle.left(90)
turtle.forward(50)
turtle.right(90)
turtle.forward(30)
turtle.setheading(0)
turtle.pendown()
turtle.fillcolor('red')
turtle.begin_fill()
turtle.circle(80)
turtle.end_fill()
```