

Chapter 3 Review Questions

1. Words added to programs to explain complex areas or to add clarity and are not executed when the program runs are _____.
2. The _____ function is used to display output in Python.
3. In Python, literal strings can be surrounded by single or double _____.
4. In order to execute a function, it must be _____.
5. A(n) _____ is an item passed to a function.
6. A _____ is a sequence of characters in source code.
7. The equal sign is used to _____ a value to a variable.
8. The _____ side of the assignment statement is assigned to the _____ side.
9. _____ are used to store values in memory.
10. A variable must be _____ before it can be used by the program.
11. Integer, float, and string are examples of data _____.
12. The _____ data type can be only true or false.
13. Variable names (can or cannot) _____ begin with a number.
14. _____ should be used in place of magic numbers.
15. Floating point numbers in Python are stored with _____ precision.
16. When multiple arguments are passed to the print function, they are separated by _____ in the output by default.
17. To suppress or replace the default separator for multiple arguments when calling the print function, the _____ argument is used.
18. Concatenation refers to _____ two or more strings.
19. The term immutable means that strings in Python cannot be _____.
20. The _____ function is used to set the number of decimal places in the output of a number.
21. To suppress the automatic line feed after a print function call, the _____ argument is passed.
22. The _____ escape character is used to produce a tab.
23. The _____ function is used to obtain input from the keyboard.
24. Converting an item to a different data type is known as _____.

Chapter 3 Short Answer Exercises

1. What do the following lines of code output?

```
ounces_per_can = 6
print('Ounces: ', ounces_per_can)
```

2. What is the result when the following lines of code are executed?

```
number = 23
print('The number is ' + number)
```

3. What do the following lines of code output?

```
num = 123.4567
print('Number is ', format(num, '.2f'))
```

4. What do the following lines of code output?

```
num = 12
print('Number is ', format(num, '.2f'))
```

5. What do the following lines of code output?

```
num = 8.367
print('Number is ', format(num, '.1f'))
```

6. In following expression, what does the number "8" specify?

```
print(format(var1, '8.4f'))
```

7. In following expression, what does the letter "d" specify?

```
print(format(var1, 'd'))
```

8. Which of the following variable names follow proper naming conventions?

- a. average
- b. 8pieces
- c. netPay\$
- d. gross pay
- e. hourly_rate

9. What type of variable is defined in this expression?

```
INTEREST_RATE = 0.07
```

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10. What is the output from the following statement?

```
num = 850
print('The number twice is ', num, num, sep='')
```

11. What is the output from the following statement?

```
var1 = 'my'
var2 = 'dog is'
var3 = 'happy'
print(var1, var2, var3)
```

12. What is the output from the following statement?

```
print(format(24, '.3f'))
```

13. What is the output from the following statement?

```
print(format(98765.378, ',.2f'))
```

14. What is the output from the following statements?

```
print('Press the Enter key ', end='')
print('when ready.')
```

15. What is the output from the following statements?

```
print('She said \'Hello\'.')
```

16. In the expressions below, what will be the value assigned to result?

- a. result = 5 // 2
- b. result = 7 / 2
- c. result = 4 * 3 / 2
- d. result = 5 % 2
- e. result = 2**3

17. In the expressions below, what will be the value assigned to balance?

- a. balance = round(5.4)
- b. balance = round(3.6)
- c. balance = round(6.767, 2)
- d. balance = round(-13.5)

18. In the code below, what data type will be stored in salary? Is it the correct data type for the request?

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```
salary = int(input('Enter your salary: '))
```

19. Express the following equations in Python code.

- a. $4xy$
- b. $z = 2ab$
- c. $y = b^2 - 4ac$
- d. $t = \frac{a + b}{x - y}$

Chapter 3 Programming Exercises

1. Write a program that displays the following text.

Python is an interpretive language.

2. Write a program that displays the following text with Python in quotes.

The language is "Python".

3. Write a program that displays the following text with the apostrophe.

That doesn't add up!

4. Write a program that prompts the user to enter their name and then displays 'Hello ', and the name that was entered.

5. Write a program with three variables: `first`, `second`, and `third`. Assign the values 5, 6, and 7 to the variables and display each on a separate line.

6. Write a program that uses the Named Constant below to display 'The interest rate is ', followed by the constant value.

```
INTEREST_RATE = 7
```

7. Write a program that assigns the variable `tickets` the value 125 and then displays, 'The tickets sold today were ', followed by the variable.

8. Write a program that defines three variables named `word1`, `word2`, and `word3`. Assign 'abc' to `word1`, 'def' to `word2`, and then assign `word1` and `word2` combined to `word3` using concatenation. Then display `word3`.

9. Write a program that uses a format specifier to display the number 12345.678 formatted with commas and two decimal places as shown.

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12,345.68

10. Write a program that displays the numbers below on separate lines, with two (2) decimal places, and in fields that are eight (8) characters wide.

123.45 1452.56 56.80

11. Write a program that uses three (3) print statements to display the words **No**, **lines**, and **between** all on one line with spaces between the words.
12. Write a program that prompts the user to enter their age and then displays 'Your age is' and the age that was entered
13. Write a program that prompts the user to enter a number, and then a second number. The program will add the numbers, and display 'The sum of the numbers is: ', and the result.
14. Write a program that computes the total cost of a meal based on the meal price entered by the user, plus a 20% tip, and 5 percent sales tax. The output should be displayed as shown below and include a dollar sign and two decimal places.

```
Enter the price of the meal: $27.56
Total price is $ 34.45
```

15. Expand number 14 to include output of the tip, and tax amounts, before the total price. The output should include a blank line between the input prompt and the output, and include dollar signs and two (2) decimal places for dollar amounts.

```
Enter the price of the meal: $34.98

The tip amount is $ 7.00
The tax amount is $ 1.75
The total price is $ 43.73
```

16. Write a program that prompts the user to enter a Fahrenheit temperature, computes the Celsius temperature and displays the 'The Celsius temperature is: ', and the result. The equation for the conversion is:

$$C = (F - 32) / 1.8$$

Test data: When F = 23, C = -5

17. Write a program that prompts the user to enter the lengths of the two sides of a rectangle. The program will compute the area and perimeter, and assign the

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values to two variables. Then display the computed values with their titles as shown in the example below.

```
Enter side length one: 3
Enter side length two: 4
The area is: 12.0
The perimeter is: 14.0
```

18. Write a program for a Yogurt vendor that computes the total sales and profit for a day's sales based on the number sold at \$6.50 each, and the cost of the Yogurt to the vendor which is \$4.25 each. The profit is the total sales minus the total cost. The program will display the output as shown in the example below.

```
Enter the number sold: 10
Units sold: 10
Total sales: $ 65.00
Total cost: $ 42.50
-----
Profit for the day: $ 22.50
```

19. Write a program that prompts the user for two integers (x and y) and computes a result using the equation below. Note the output when y is entered as 1.

$$answer = \frac{x + 2}{y - 1}$$

20. Part #1: The surface area of a sphere is given by the equation below. Write a program that prompts the user for the radius of a sphere as a float and the units of measure (feet, miles, etc.), computes the surface area, and displays the result with the square units. Use the operator for exponentiation in the solution, and format the output to 3 decimal places. Use 3.14159 as the value for PI.

$$Surface\ area = 4 \pi r^2$$

Part #2: The volume of a sphere is given by the equation below. Write a program that prompts the user for the radius of a sphere as a float and the units of measure (feet, miles, etc.), computes the volume, and displays the result with the units. Use 3.14159 as the value for PI.

$$Volume = 4\pi \frac{r^3}{3}$$

Part #3: Combine parts 1 and 2 into a single program that prompts the user for a radius as a float and the units of measure and displays both the surface area and the volume of the sphere. Note the radius of the earth at the equator is 3,963.2

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miles, and the radius of the moon 1,079.6 miles. The output for these inputs is shown below for validation purposes.

```
Enter the radius of a sphere: 23.7
Enter the units (feet, miles, etc.): feet
The surface area is: 7,058.399 square feet
The volume is: 55,761.350 cubic feet
```

Chapter 3 Programming Challenge

Loan Calculator

Design and develop a program for a car dealer that computes the monthly payment, total payback amount, and total interest paid for a car loan based upon the loan amount, interest rate, and loan duration in months.

The equation for determining the monthly payment for a loan is:

Monthly Loan Payment Formula: $MP = L * (r / (1 - (1 + r)^{-N}))$.

- MP = monthly payment amount
- L = principal, meaning the amount of money borrowed
- r = effective interest rate. Note that this is usually not the annual interest rate (see below).
- N = total number of payments

Calculate the effective interest rate (r) - Most loan terms use the "nominal annual interest rate," but that is an annual rate. Divide the annual interest rate by 100 to put it in decimal form, and then divide it by the number of payments per year (12) to get the effective interest rate.

- Example, if the annual interest rate is 5%, and payments are made monthly (12 times per year), calculate $5/100$ to get 0.05, then calculate the rate:

$$\text{Effective rate} = 0.05 / 12 = \mathbf{0.004167}.$$

Sample output:

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Enter the loan amount: 10000
Enter the interest rate: 4.5
Enter the duration in months: 48

The monthly payment is \$ 228.03
The payback amount is \$ 10945.67
The total interest is \$ 945.67