Python Basics Exercise Set

Easy (10 Questions)

1. What will the following code print?

```
x = 5
if x > 3:
    print("Hello")
print("World")
```

   - Explain why indentation matters here.

2. Write a single-line comment and a multi-line docstring in Python that describe what your code does.
3. Declare variables for each of the following data types:
   - Integer
   - Float
   - String
   - Boolean
4. Convert the string `"123"` into an integer and add `10` to it.
5. Create a list of 5 numbers and print the second element.
6. Create a tuple with three strings and show how to access the last element.
7. What's the difference between `is` and `==` in Python? Give a small code example.
8. Use an arithmetic operator to compute the remainder of `19 ÷ 4`.
9. Write a loop that prints numbers from 1 to 5.
10. Define a simple function `greet()` that prints `"Hello from Python!"`.

Medium (10 Questions)

11. Explain dynamic typing in Python with an example.
12. Write code to:
    - Create a set with values `{1, 2, 3, 3, 2}`
    - Print the set
    - Explain why duplicates are removed.

13. Write a dictionary with keys `"name"`, `"age"`, and `"city"`, and then print the `"city"` value.
14. Demonstrate the use of:
    - `and`
    - `or`
    - `not` in three short expressions.
15. Write a program using a `for` loop to calculate the sum of numbers from 1 to 100.
16. Create a `while` loop that keeps asking the user to type `"stop"` until they do.
17. Show an example of using `break`, `continue`, and `pass` in loops.
18. Define a function `add_numbers(a, b=10)` that returns the sum of its arguments.
    - Call it with one argument.
    - Call it with two arguments.
19. Write a function that takes any number of arguments (`*args`) and prints their sum.
20. Show the difference between global and local variables with a code example.

◈ Hard / Tricky (5 Questions)

21. Write a function that takes both `*args` and `**kwargs` and prints them in a readable way.
22. Explain the LEGB rule of variable scope with a small example.
23. Given this code:

```
a = [1, 2, 3]
b = a
c = a[:]
a.append(4)
print(b)
print(c)
```

    - What will be printed and why?
24. Read the contents of `data.txt` using a context manager (`with open`), and print each line without extra newline characters.

25. Write code that tries to divide a number by zero, catches the exception, and prints `"Cannot divide by zero!"`. Then, ensure `"Done"` is always printed at the end.

◈ Use-Case / Practical (5 Questions)

26. Write a function `count_words(filename)` that opens a `.txt` file and returns the number of words in it.
27. Write a program that:
    - Opens a `.json` file
    - Reads its content
    - Converts it into a Python dictionary.
28. Create a `.csv` file named `users.csv` with the following content:

```
name,age
Alice,30
Bob,25
```

Then write a Python program to read it and print each row.

29. Create a custom exception class called `NegativeNumberError`. Raise it if a user tries to input a negative number.
30. Imagine you are writing a DevOps script:
    - Open a log file (`app.log`)
    - Count how many times the word `"ERROR"` appears
    - Print the count.
