Worksheet 10: Python Factor Problems

Name: _____ Date: _____

Instructions

- Answer in the blanks.
- For "write code" questions, write valid Python code (no functions needed).
- For "what does it print" questions, write the exact output (line by line).
- You may assume all inputs are valid (unless the question says otherwise).

Part A — Modulo `%` and Divisibility

1) Quotient and remainder (fill in the blanks)

Fill in the quotient and remainder.

- 17 ÷ 5 → quotient _____ , remainder _____
- 20 ÷ 6 → quotient _____ , remainder _____
- 45 ÷ 9 → quotient _____ , remainder _____

2) What does it print?

```
print(20 // 6)
print(20 % 6)

print(45 // 9)
print(45 % 9)
```

Output:

3) Divisible or not? (circle True/False)

Remember: "divisible" means the remainder is 0.

- `18 % 6 == 0` → True / False
- `18 % 5 == 0` → True / False
- `27 % 9 == 0` → True / False
- `27 % 8 == 0` → True / False

4) Write code: last digit and "remove last digit"

Write code that prints:

1) the last digit of `n`
2) `n` with the last digit removed

Your code:

```
n = 2026

# complete the code:
```

Expected output:

```
6
206
```

Part B — Factors

5) Factors by thinking (no code)

List all factors.

- Factors of `10` : _____
- Factors of `15` : _____

6) Fill in the blanks: check a factor

Fill in the blanks so the code prints the sentence **only if** `i` is a factor of `n` .

```
n = 16
i = 5

if _____:
    print(str(i) + " is a factor of " + str(n))
```

7) What does it print? (find factors)

```
n = 8

for i in range(1, n + 1):
    if n % i == 0:
        print(i)
```

Output:

8) Indentation fix (find factors)

The code below has an indentation problem. Fix it so it prints all factors of 12 .

```
n = 12

for i in range(1, n + 1):
if n % i == 0:
    print(i)
```

Correct code:

Part C — Counting and using factors (new challenges)

9) Count factors (write code)

Write code that counts how many factors n has.

```
n = 12

count = 0

# complete the code
for i in range(_____, _____):
    if _____:
        count = _____

print(count)
```

Expected output:

```
6
```

10) Sum of factors (write code)

Write code to compute the **sum of all factors** of n .

```
n = 12

# complete the code:
total = _____

for i in range(_____, _____):
    if _____:
        total = _____

print(total)
```

Expected output:

```
28
```

11) Largest proper factor (write code)

A **proper factor** of n is a factor **smaller than** n .

Write code to print the **largest proper factor** of n .

```
n = 18

# complete the code:

for i in range(_____, _____, _____):
    if _____:
        print(i)
        break
```

Expected output:

```
9
```

Part D — Prime numbers

12) Prime or not? (by thinking)

Decide whether each number is prime.

- ` 11 ` is prime: True / False
- ` 12 ` is prime: True / False
- ` 13 ` is prime: True / False
- ` 21 ` is prime: True / False

13) What does it print? (prime check)

```
n = 17

is_prime = True

for i in range(2, n):
    if n % i == 0:
        is_prime = False
        break

print(is_prime)
```

Output:

14) Fill in the blanks (prime check)

Fill in the blanks so the code correctly prints `True` if `n` is prime, else `False`.

```
n = 29

is_prime = True

for i in range(2, _____):
    if _____:
        is_prime = _____
        break

print(is_prime)
```

15) Prime check

Complete the code and print the output.

```
n = 21
is_prime = True

for i in range(2, n):
    if n % i == 0:
        is_prime = False    # found a factor
        _____

print(is_prime)
```

Output:

Part E — Mini coding task

16) Print the first factor (write code)

Goal:

- If `n` is **not** prime, print its **smallest factor bigger than 1**.
- If `n` is prime, print `"prime"`.

```
n = 49

# complete the code:
found = _____

for i in range(_____, _____):
    if _____:
        print(i)      # smallest factor > 1
        found = _____
        _____  # stop the loop

if found == _____:
    print("_____")
```

Expected output:

```
7
```