Solution 10: Python Factor Problems

1) Quotient and remainder (fill in the blanks)

- 17 ÷ 5 → quotient **3**, remainder **2**
- 20 ÷ 6 → quotient **3**, remainder **2**
- 45 ÷ 9 → quotient **5**, remainder **0**

2) What does it print?

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

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

Output:

```
3
2
5
0
```

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

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

4) Write code: last digit and “remove last digit”

One correct answer:

```
n = 2026

print(n % 10)   # last digit
print(n // 10)  # remove last digit
```

Expected output:

```
6
202
```

5) Factors by thinking (no code)

- Factors of `10` : **1, 2, 5, 10**
- Factors of `15` : **1, 3, 5, 15**

6) Fill in the blanks: check a factor

```
n = 16
i = 5

if n % i == 0:
    print(str(i) + " is a factor of " + str(n))
```

(For `n = 16` and `i = 5` , nothing prints, because 5 is not a factor.)

7) What does it print? (find factors)

```
n = 8

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

Output:

```
1
2
4
8
```

8) Indentation fix (find factors)

One correct fix:

```
n = 12

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

9) Count factors (write code)

One correct answer:

```
n = 12

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

print(count)
```

Output:

```
6
```

10) Sum of factors (write code)

One correct answer:

```
n = 12

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

print(total)
```

Output:

```
28
```

11) Largest proper factor (write code)

One correct answer (scan upward and stop):

```
n = 18

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

Output:

```
9
```

12) Prime or not? (by thinking)

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

```
True
```

14) Fill in the blanks (prime check)

One correct answer:

```
n = 29

is_prime = True

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

print(is_prime)
```

Output:

```
False
```

16) Print the first factor (write code)

One correct answer:

```
n = 49

found = False

for i in range(2, n):
    if n % i == 0:
        print(i)      # smallest factor > 1
        found = True
        break

if found == False:
    print("prime")
```

Output:

```
7
```