

Coding with Python

Ontario MTH1W · coding: variables, data types, loops and conditionals

MOST TESTED What does this program print?

```
total = 0
for k in range(1, 6):
    total = total + k
print(total) (card 7)
```

vertexmath.ca
Worksheet, answers &
this cheat sheet



Which tool?

You know how many times
to repeat

for loop

Repeat until a goal is
reached

while loop

Pick one action from
several

if / elif / else

1 Variables and print

```
score = score + 5
```

USE = **stores** the right side's value on the left; **== tests** if two values are equal.

TIP print("x") shows x, not its value.

TRAP a = 4, b = a, a = 9: b is still 4, not 9.

2 Operators

Order: brackets, **, then * / // %, then + -.

7 / 2	3.5 (float)
7 // 2	3 (quotient)
7 % 2	1 (remainder)
7 ** 2	49 (power)

TIP round(x, 2): 2 decimals. # starts a comment.

TRAP 1/(2k) is 1 / (2 * k);
1 / 2 * k is half of k.

3 Data types and input

```
age = int(input("Age: "))
```

USE input() gives a str: convert it before you calculate.

int	whole: 42
float	decimal: 4.0
str	text: "42"

TRAP Type 6 into n = input(): n * 2 is "66", not 12.

TRAP int(4.9) is 4, not 5; int("4.9") is a ValueError.

4 The math library

```
import math
math.sqrt(x) → √x
math.pi → 3.14159...
```

EXAMPLE Legs 5 and 12:
math.sqrt(5**2 + 12**2)
gives 13.0.

TRAP 3 ^ 2 is 1, not 9. A power is
3 ** 2.

5 for loops

for i in range(...): runs once per value.

range(5)	0, 1, 2, 3, 4
range(2, 6)	2, 3, 4, 5
range(1, 10, 3)	1, 4, 7

TRAP range(1, 8) stops at 7. For 8, use range(1, 9).

6 while loops

USE Tests **before** each pass; stops once False.

EXAMPLE Prints 81:
n = 1
while n < 50:
 n = n * 3
print(n)

TRAP Saving \$40 a week for \$300, the loop counts 8 weeks, not 300 ÷ 40 = 7.5.

7 Running total

EXAMPLE Prints 15 (1 + 2 + 3 + 4 + 5):
total = 0
for k in range(1, 6):
 total = total + k
print(total)

TIP Product? Start at 1.

TRAP total = 0 **inside** the loop resets it each pass: it prints 5, not 15.

8 Conditional statements

USE Only the **first** true branch runs.

if mark >= 80:	"A"
elif mark >= 70:	"B"
else:	"C"

TIP A nested if runs only if the outer test is True.

TRAP For mark = 80, mark > 80 is False. Use >= when the endpoint counts.

9 Loops with branches

USE In a loop, n % 4 == 0 finds multiples of 4.

EXAMPLE \$500 at 4% for 3 years:
m = m * 1.04, 3 times, gives 562.43.

TRAP At 10¢/kWh, -80 kWh prints a bill of -8.0. Check inputs with if first.