Doin' MATH

Math?!?!

What are some basic mathematical operators that you guys can do on your calculators?

Mathematical Operators

Python can perform all the same basic operations as a calculator - Addition, Subtraction, Multiplication, and Division.

For each of these, 2 number values are necessary - int **or** float.

Either value can be a variable or a specific number.

Example:

```python
num_1 = 8 + 2              # 2 Numbers
num_2 = num_1 - 6          # Variable & Number
num_3 = num_1 * num_2      # 2 Variables
```

Full List of Operators

Operator	Meaning	Example
+	Addition	10 + 4 = 14
-	Subtraction	10 - 4 = 6
*	Multiplication	10 * 4 = 40
/	Division	10 / 4 = 2.5
//	Integer Division	10 // 4 = 2
**	Exponentiation	10 ** 4 = 10,000
%	Modulus (Remainder)	10 % 4 = 2
-	Negation	-10 = -10

More about Modulus

The **Modulus** operator, represented by a **%**, is used when we want to do division and find the **remainder** instead of the **quotient**.
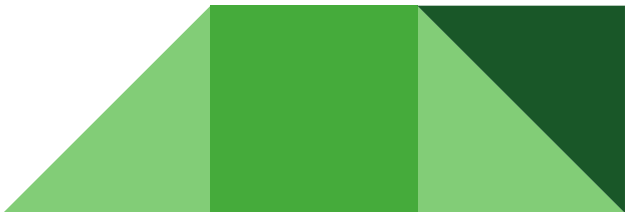
Remember back to doing long division in Elementary school!

Let's say I want to find the result of 17 % 5.

If I do 17 / 5, I get a quotient of 3, and a remainder of 2.

Therefore, 17 % 5 = 2!

$$
\begin{array}{r}
3 \\
5\overline{)17} \\
-15 \\
\hline
\mathbf{2}
\end{array}
$$

Useful Application of Modulus

One of the most frequent applications of the % operator will be determining if a value is **even** or **odd**.

A value is **even** when it is a multiple of 2 - when there is **no remainder** if it's divided by 2!

A value is **odd** when it isn't a multiple of 2 - when there is a **remainder of 1** if it's divided by 2!
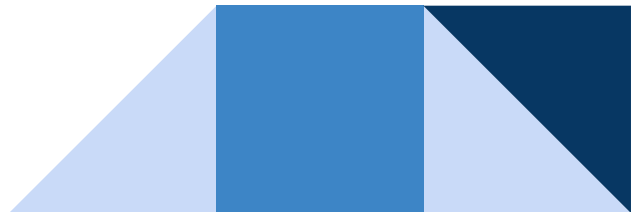
Modulus Practice

1. What is 15 % 6?

   15 % 6 = 3.
   That's because the biggest multiple of 6 that fits into 15 is 12, and 15 - 12 = **3**.

2. What is 10 % 2?

   10 % 2 = 0.
   That's because the biggest multiple of 2 that fits into 10 is 10. There is no remainder from this division!

2 Types of Operators

Binary Operators - take a value on **both** sides (most of those are binary operators)

Example: **2** **+** **2** - the **+** takes a value on both sides here.

Unary Operators - take a value on only **one** side (really just the **-**)

Example: **-** **4** - the **-** takes a value on only its right side.

Note: The **-** operator can operate in both a binary and unary capacity.

Remember PEMDAS?

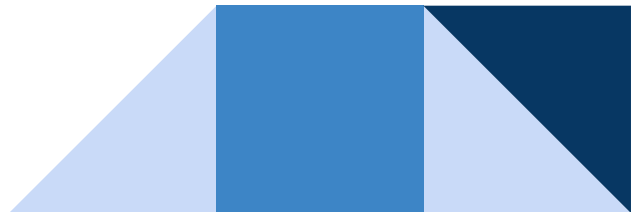**P** - **P**arentheses

E - **E**xponents   **N**egation

M - **M**ultiplication (and **M**odulus)

D - **D**ivision

A - **A**ddition

S - **S**ubtraction

Practicing PENMDAS

- 6 - 3 ** 2 / (1 + 1)

Practicing PENMDAS

- 6 - 3 ** 2 / **(1 + 1)**

Practicing PENMDAS

- 6 - 3 ** 2 / 2

Practicing PENMDAS

- 6 - **3 ** 2** / 2

Practicing PENMDAS

- 6 - 9 / 2

Practicing PENMDAS

- 6 - **9 / 2**

Practicing PENMDAS

- 6 - 4.5

Practicing PENMDAS

- 10.5