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Coláiste na hOllscoile Corcaigh

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CS1205 Programming Fundamentals I

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Exercise List I
Variables, Output, Expressions, Types, Input

Please remember Add appropriate comments to your programs
Use formatted printing

Basic Operations in Python	
Addition	+
Subtraction	-
Multiplication	*
Division	/
Integer division	//
Exponentiation	**
Modulo (or remainder)	%

Some mathematical functions need to be accessed through the math library. As examples we have sine and cosine functions, as well as e^x and many others (see Lab 1 exercises and solution).

For instance, if you want to calculate the expression:

$e^x + \cos 30°$

You need first to import the math library. The command for that is:

```
import math
```

Then, once you have variable x already holding a value, you have also to convert 30° to radians and then finally calculate the expression:

```
angle = math.radians(30)
express = math.exp(x)+math.cos(angle)
```

1. Calculate and print the following expressions in Python:

   a) $20 + 15$ integer

   b) $20 - 15$ integer

   c) 20×15 integer

   d) $\frac{20}{15}$ integer

e) $\frac{20}{15}$ floating point

f) $20.55 + 15.34$ floating point

g) $20.55 - 15.34$ floating point

h) 20.55×15.34 floating point

i) $\frac{20.55}{15.34}$ rounded to integer

2. Calculate the same expressions as in exercise 1, but now preset each value to a variable. Print each variable that is floating point using a formatted output with two digits after the decimal point (**ex**: if the result is 23.444444 the printing should read: 'The result is 23.44').

3. Re-do exercise 2 but now, instead of pre-setting the variables, calculate the expressions with numbers read from the user. Write appropriate messages asking for values.

4. Print all the variables in exercise 2 in a single formatted output, reading ' The results are [res1] [res2]...[resn]'. Print them with three decimal places.

5. Write Python code to read to integer values from user (ex. A and B) and then print if A is divisible by B or not. If is is, print the result of the division. If it is not, calculate and print the remainder of the division.

6. Calculate and print the multiplication table for an integer number input by the user, showing the results on the screen.

7. Calculate the following as operations, printing the result on screen.

   a) $O = \frac{\frac{12\times4.5}{3} + \frac{7.6-16.3}{9.9}}{\frac{125.5}{45}}$

   b) $F = \frac{532+3}{13.5} + 3 \times 200 - 4 \times \frac{70.53}{2.5}$

   c) $\cos^2 x + \sin^2 x$, x in degrees, preset by you.

8. Create variables by attributing to them your name, student number, PPSN, birth city and Course you are undertaking, then print those contents with the proper messages on screen. Obs. Attention to the types of the variable.

9. Write and test code in Python to calculate how many seconds there are in a number of weeks **W**.W should be read from the user.

10. Calculate and print the following expressions in Python, considering all floating point numbers and printed with three decimal places.

    a) $A = \frac{2.5^3+4^2\times25.3^{0.5}}{8.6}$

    b) $B = 20^3 - 65.4^{54} + 20^{105}$

    c) $C = \frac{x^{3.433}+y^2}{2.67+2^8}$, with x and y floating point variables having values read from the user.