# Commands, Numbers and Variables

## Part I - Commands/Arguments

What is a command and how can we use them? What does it mean to pass an argument to a command?

a) **print()**
d) **pow()**
e) **round()**
f) **type()**
g) **help()**

## Part II - Numbers

1) Python is also a calculator. Use the python shell to find the answers to the following questions:

a) 23 * 56 =

b) 23 / 56 =

c) 573.36 + 289.03 =

d) -9 + 20 =

e) 3.14 + 2.5 * 82.13 =

f) 4.7 + 2.3 =

2) We have 2 types of numbers in python: **int**, which stands for integer or whole number, and **float**, which is a number with a decimal point. Here are some examples:

```
int : 2, 45, -23, 0, 256
float : 4.3, 6.09, -78.83, 0.0034
```

For each of the answers in question 1) say whether it is an **int** or a **float**.

3) Python can tell us whether a number is an int or a float when we use the type() command. Here is an example when we use type() on a float. Try it.

```
>>>type(3.14)
<class 'float'>
```

The keyword class is just another name for type. It is saying the type of 3.14 is a float. Check your answers for question 2 using the type() command. Were you correct?

4) Python can also handle more advanced math functions. For each question below, find the answer using a python command. Also give the command you used. The first is done for you.

In the console, write **import math** before starting the below problems.

a) Round up 4.6

```
>>>math.ceil(4.6)
```

b) Round down 76.43

c) Round up 89.98

d) Round 10.5

e) √49 =

f) cos(12) =

g) sin(45) =

```
math.ceil(), math.floor(), math.sqrt(), round()
```

5) So far we have been using commands which only take one argument, but some commands take more, and others don't have any arguments. For example the **help()** command doesn't need any arguments at all. Now let's have a look at the **pow()** command. Remember from your math classes the exponent of a number says how many times to multiply that number by itself. For example:

$8^2 = 8 \times 8 = 64$

Here, 8 is the number and 2 is the exponent. We can do this in python with the **pow()**

```
>>>pow(8, 2)
64
```

All we need to do is separate the arguments with a comma. How would you use the **pow()** command to find the answer to these?  Write the answer to the problem below:

a) $12^3$

b) $36^2$

c) $4^8$

d) $2^{-1}$

e) $16^{0.5}$

## Part IV - Variables

1) A variable is a container we can put things in. We can store all types of stuff in a variable, but for now we'll just look at storing numbers. To make a variable, we need to choose a name and put something in it.

Make a variable **apples** and assign it the number **7**. Use the **print()** command to see how many apples we have:

```
>>> apples = 7
>>> print(apples)
```

Change the number of **apples** to **12** and **print()** again. Try it with some other numbers. Also, once we've created **apples**, we can just type **apples** to see what it Holds.

2) A variable name must start with a letter, and can only contain letters, numbers or the '_' character. **CIRCLE the valid variable names below.**

Try to create them in python by copying them into the python shell and assigning the number 3 to them.

| | | | |
|---|---|---|---|
| Apples | appLES | apples3 | apples 3 |
| 3apples | Apples_3 | applesAreNice | I_have_3_apples |

3) Create 3 variables, apples, oranges and bananas and assign them the values 3, 4 and 5 respectively:

```
>>> apples = 3
>>> oranges = 4
>>> bananas = 5
```

Use **print(apples, oranges, bananas)** to see how many of each we have. We can assign a variable another variable. In python, type:

```
>>> apples = oranges
```

How many apples do we have?

Now, in the following examples, type the code and answer the questions. Try to answer the questions first and then use the print command to check your answer.

```
>>> apples = 4
>>> oranges = 5
>>> bananas = apples
```

a) How many apples do we have?

b) How many bananas do we have?

```
>>> oranges = 7 - 4
>>> apples = 2 * 8
```

c) How many oranges do we have?

d) How many apples do we have?

```
>>> apples = 7
>>> oranges = apples + 2
```

e) How many oranges do we have?

```
>>> oranges = 4
>>> apples = oranges * 2
```

f) How many oranges do we now have?

```
>>> bananas = 8
>>> bananas = bananas + 2
```

g) How many bananas do we have?