Numbers and Variables

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Example 1. *In order to do any math we're going to need some numbers. Numbers are different from strings.*

```
apples = 3
print apples
oranges = apples + 1
print oranges
```

Example 2. *Let's try assigning some more numbers. Before you run, what do you think will print? Surprised?*

```
apples = 1
oranges = apples
apples = 2
print apples, oranges
```

Example 3. *Operations! We have the usual addition, subtraction, multiplication, division and exponents.*

```
x = 5
y = 2
print x + y
print x - y
print x*y
print x/y
print x**y

x = 5.0
y = 2.0
```

```
print x + y
print x - y
print x*y
print x/y
print x**y

print (x + y)**2 - y**(0.5) + x*(y + 3)
```

Now we are seeing the difference between integers and floating point numbers. The computer treats integers and decimals differently. An integer can be represented exactly in the computers memory while a real number can only be stored approximately. Operations with integers are faster and exact. Sometimes you want integers, sometimes you want floats. For floats remember to put a decimal in your numbers. We can now combine numbers in complicated ways.

To change a float to an integer and an integer to a float try:

```
x = int(5.4)
y = float(3)
print x, y
```

To get the fractional part of an integer division try:

```
x=5
y=2
print x, "divided by", y, "is", x/y, "with remainder", x%y
print "or about", float(x)/float(y)
```

Example 4. *If you want to do inputs with numbers you'll need to tell the computer whether the input is an integer or float.*

```
print "I'm your computer. Let's get to know each other"
print "Please enter your favourite number."
your_fav=int(raw_input(">"))
print "so your favourite number is", your_fav, "eh?"
comp_fav = 7
print "my favourite number is", comp_fav
```

Example 5. *Write a program that asks for a number and then returns the number squared and/or write a program that asks for two numbers and returns their sum and/or write a program involving numbers to do something fun.*

Example 6. *Quadratic Formula. Write a program that asks for values a, b and c and solves for x in* $ax^2+bx+c=0$. *Check your answers with Wolfram Alpha.*

Example 7. *At times today we may want to have Python produce a (sudo)random number. A handy way to do this is to use the 'randint' command. There is a library called 'random' that has lots of commands about random numbers. We need to tell Python that we're going to be using it.*

```
from random import randint
x = randint(0,10) # picks a random number between 0 and 10
print x #can the output be 0? can the output be 10?
```

Example 8. *Try writing a program to use random numbers. Write a program that asks for two numbers and returns a random number between the two inputs.*