2. Namespace
    a. Use dir() to view namespace

    b. Add names to namespace with:
        i. **Assignment**, x = 4
        ii. **Import**, import math
        iii. **Function definition**, def main()

    c. Can use dir() to see names in package, dir(math)

Variables – Labels for Objects

1. Objects
    a. Everything in Python is an object

    b. Variable is a name for an object

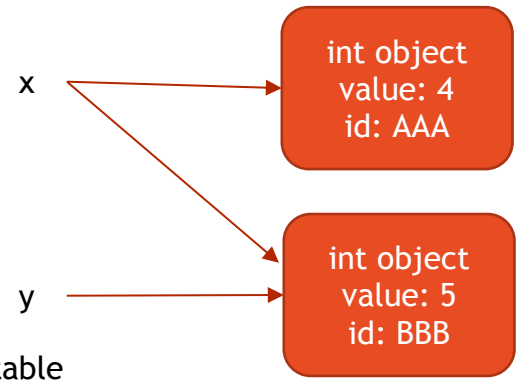
    c. Every object has
        i. Value
        ii. Type, see **type()**

    d. Objects can be
        i. Mutable (list)
        ii. Immutable (int, string)

    e. See Memory Picture
        i. x = 4
        ii. print(x)
        iii. x = x + 1

f. Each object has a unique identifier, see id()

```
x = 4
id(x)   AAA
x = x + 1
id(x)   BBB
y = 5
id(y)   BBB
id(5)
id(7 - 2)
id(int(25 ** 0.5))
```

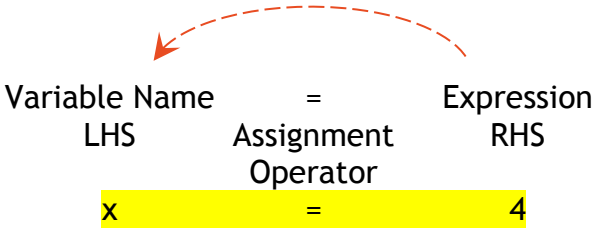


All the 5s have the same ID – int is immutable

g. Name Binding
   i. Objects can have more than one reference (name)
   ii. x and y both point to 5

h. Garbage Collection
   i. 4 will be taken care of

2. Assignment Statement
   a. = Does not mean "Equality", it means "Assignment"



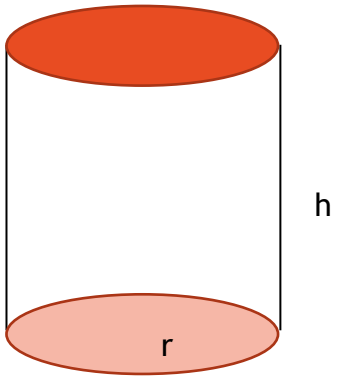
   b. x = 4
   c. x = x + 1
   d. w = x = y = z = 1
   e. x, y, z = 1, 2, 3
   f. x, y = y, z (swaps x and y)

3. Example of using names
    c. Makes code easier to read
        i. Easier to maintain too

    d. Volume of Cylinder
        i. Formula is v = $\pi r^2 h$

        ii. Write program
            1. Prompt for r and h
            2. Print volume

        iii. See 01-09-cylinderVolume.py



$V = \pi r^2 h$