

Testing Floating point inaccuracies

Introduction to Computer Science!



python™

What is the output of this code

```
#doubling.py
def dbl( x ):
    return x*2
print(doubling.dbl(50))
```

- A. 100
- B. 50
- C. Error
- D. No output

Program Bugs



- Syntax or logic errors in programs that prevent correct behavior
- Expect bugs to show up (its normal!)
- Learn to find and squash them (debug)

Writing bug-free code via testing

```
#test dbl.py
import pytest
def dbl( x ):
    return 42

def test dbl_1():
    assert dbl(0)==0

def test dbl_2():
    assert dbl(2)==4

def test dbl_3():
    assert dbl("UCSB")=="UCSBUCSB"
```

Run these tests from the unix command line:

```
$python3 -m pytest test dbl.py
```

Demo

- In class we will code a few functions and test them using pytest
- A good defensive programming strategy is to write the test code first

- Square a number
- Find the area of a circle with radius r

Floating point inaccuracies

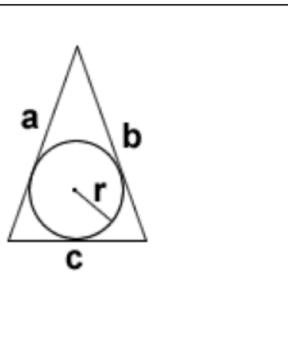
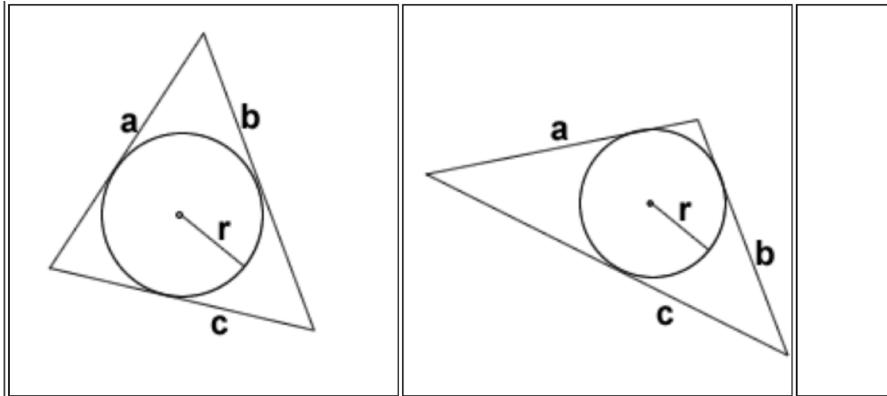
```
import math  
  
print(math.sqrt(2))  
print(math.sqrt(2) * math.sqrt(2) == 2)
```

What is printed by the last line?

- A. True
- B. False
- C. Error

Put it to practice

- Inside *every* triangle (it doesn't have to be any particular kind of triangle), it is possible to *inscribe a circle* as shown in the three below.



radius of circle inscribed in triangle,
given sides of triangle, a,b,c

First, let:

$$s = \frac{a + b + c}{2}$$

Then:

$$r = \sqrt{\frac{(s-a)(s-b)(s-c)}{s}}$$

- Write a function to computer the radius of a circle inscribed in a triangle