Approximate solutions

- Suppose we now want to find the square root of any non-negative number?
- Can't guarantee exact answer, but just look for something close enough
- Start with exhaustive enumeration
  - Take small steps to generate guesses in order
  - Check to see if close enough

Example code

```
x = 25
epsilon = 0.01
step = epsilon**2
numGuesses = 0
ans = 0.0
while (abs(ans**2 - x)) >= epsilon and ans <= x:
    ans += step
    numGuesses += 1
print('numGuesses = ' + str(numGuesses))
if abs(ans**2-x) >= epsilon:
    print('Failed on square root of ' + str(x))
else:
    print(str(ans) + ' is close to the square root
  of ' + str(x))
```

Some observations

- Step could be any small number
  - If too small, takes a long time to find square root
  - If make too large, might skip over answer without getting close enough
- In general, will take x/step times through code to find solution
- Need a more efficient way to do this