Tasks:

1. Ran unit test cases from RandomWalkTest.java before starting with RandomWalk.java. (failed)
2. Coded "move" function in RandomWalk.java to move the position of the drunkard in the x and y direction. (increment by step size)
3. Coded "randomWalk" function to iterate over the number of steps and invoke "randomMove".
4. Coded "distance" function to return the distance between the lamp post and the current position of the drunkard. (d = $\sqrt{x^2 + y^2}$)
5. Ran unit test cases from RandomWalkTest.java again and all unit test cases passed. (screenshot attached in the end)
6. Compiled and ran RandomWalk.java for multiple values of m (number of steps) and 1 experiment to isolate accurate values.
7. Compiled document for assignment report

Relationship conclusion:

$$\textbf{d} = \sqrt{n}$$

d = distance of the drunkard from the pole
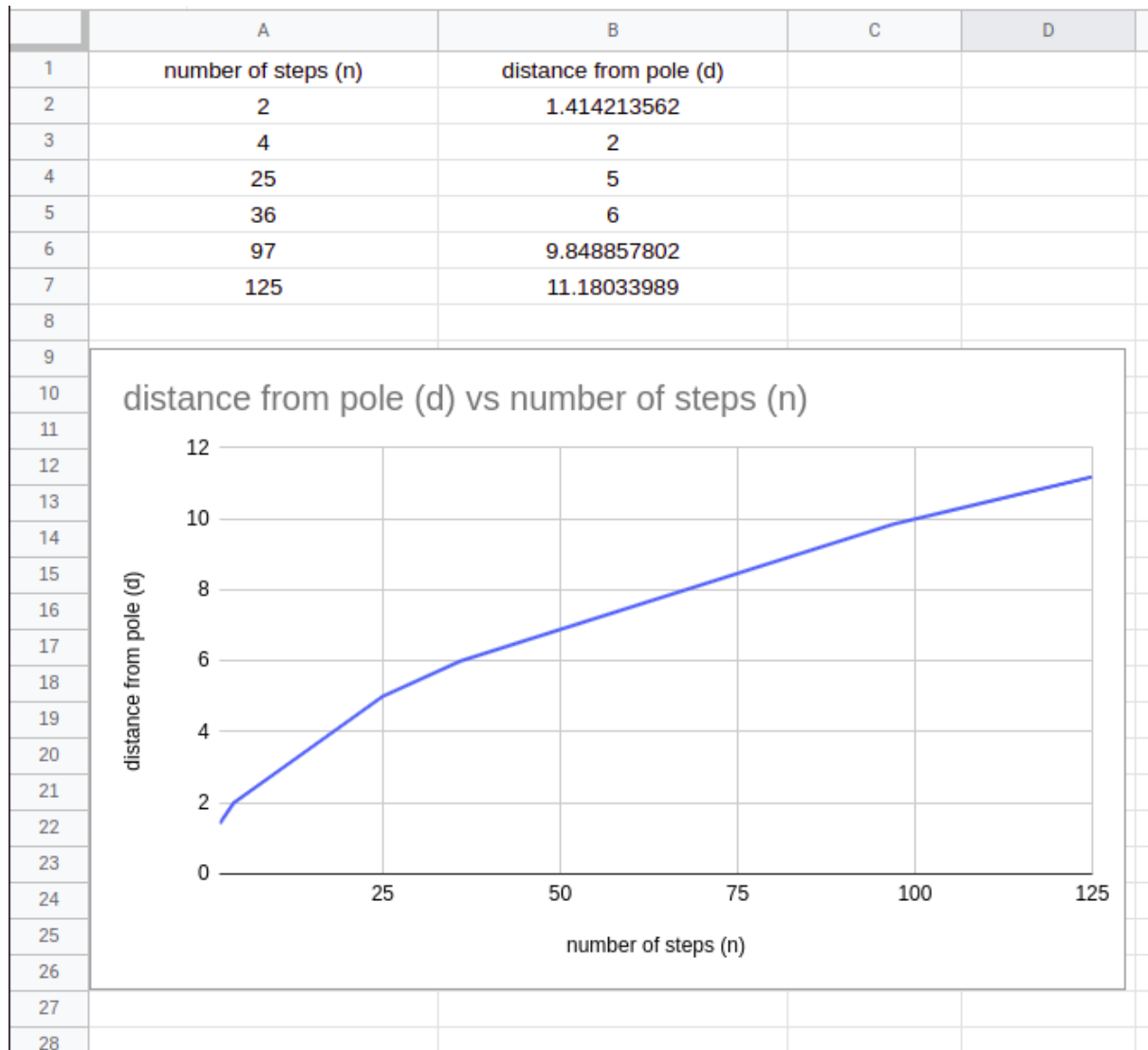
n = number of steps

Evidence:

Outputs:

```
varun@varun-Predator-G3-571:~/Northeastern/INFO 6205 - Sec 01/Assignment 0/INFO6205/src/main/java$ java edu.neu.coe.info6205.randomwalk.RandomWalk 36 1
36 steps: 6.0 over 1 experiments
```

```
varun@varun-Predator-G3-571:~/Northeastern/INFO 6205 - Sec 01/Assignment 0/INFO6205/src/main/java$ java edu.neu.coe.info6205.randomwalk.RandomWalk 2 1
2 steps: 1.4142135623730951 over 1 experiments
```

```
varun@varun-Predator-G3-571:~/Northeastern/INFO 6205 - Sec 01/Assignment 0/INFO6205/src/main/java$ java edu.neu.coe.info6205.randomwalk.RandomWalk 4 1
4 steps: 2.0 over 1 experiments
```

```
varun@varun-Predator-G3-571:~/Northeastern/INFO 6205 - Sec 01/Assignment 0/INFO6205/src/main/java$ java edu.neu.coe.info6205.randomwalk.RandomWalk 97 1
97 steps: 9.848857801796104 over 1 experiments
```

```
varun@varun-Predator-G3-571:~/Northeastern/INFO 6205 - Sec 01/Assignment 0/INFO6205/src/main/java$ java edu.neu.coe.info6205.randomwalk.RandomWalk 125 1
125 steps: 11.180339887498949 over 1 experiments
```

```
varun@varun-Predator-G3-571:~/Northeastern/INFO 6205 - Sec 01/Assignment 0/INFO6205/src/main/java$ java edu.neu.coe.info6205.randomwalk.RandomWalk 25 1
25 steps: 5.0 over 1 experiments
```

The output trends indicate d = $\sqrt{n}$

Tabulation:

	A	B	C	D
1	number of steps (n)	distance from pole (d)		
2	2	1.414213562		
3	4	2		
4	25	5		
5	36	6		
6	97	9.848857802		
7	125	11.18033989		
8				
9				

distance from pole (d) vs number of steps (n)

The above curve is that of y = $\sqrt{x}$ i.e   d = $\sqrt{n}$

UNIT TESTS: