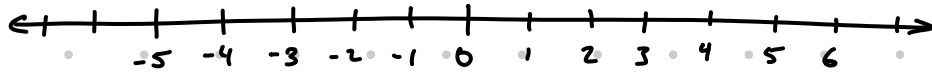


RANDOM WALKS

1-dimensional:



Observations: The average position after n steps is 0.

The average distance from the origin after n steps is an increasing function of n .

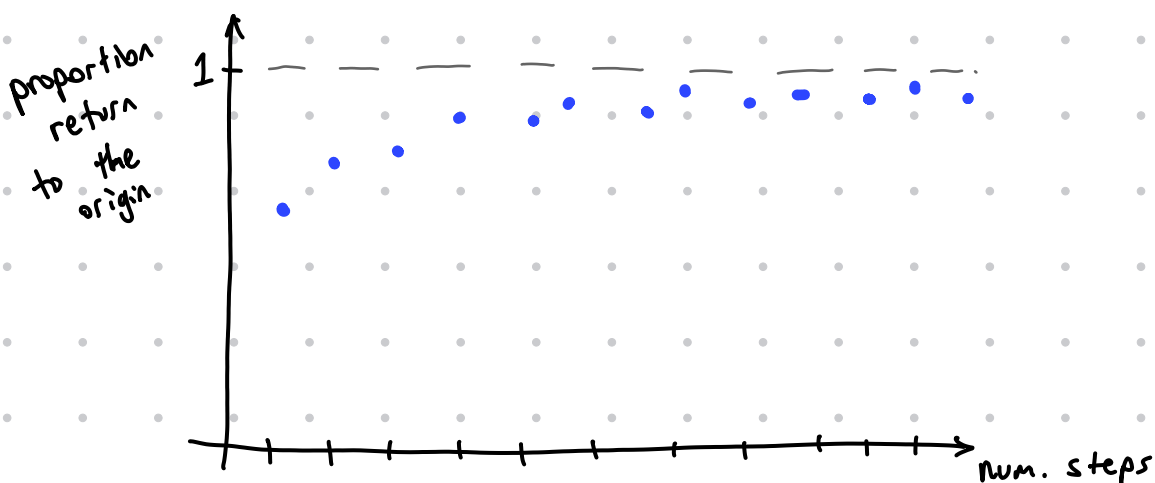
More steps $\rightarrow$ farther from the origin, in general.

Does a simple symmetric 1-D random walk return to the origin?

Simulate a random walk for N steps. (Maybe $N=100$?)

Do this many times, and count how many random walks do or don't return to the origin at least once.

Try different values of N .



THEOREM: A simple, symmetric 1D random walk returns to the origin with probability 1 (if you simulate long enough).

Moreover, the random walk will visit every integer if you could simulate for infinite time. Furthermore, it will visit every integer infinitely many times!