

Solution – Random walk

Know that

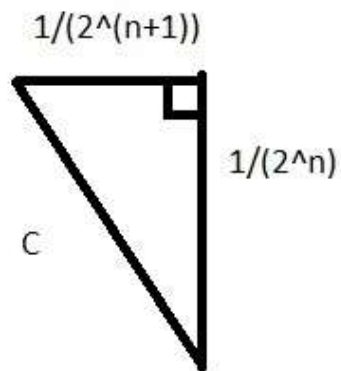
$$2 = 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$$

Suppose the man walks East every time. Then he will walk 2 miles East.

Suppose the man walks East and then North every time after that. Then he will walk one mile east and one mile north. He will be a distance of square root of two from the bar.

These are the biggest and smallest cases.

The biggest distance is 2 and the smallest distance is about 1.414.



$$A^2 + B^2 = C^2$$

$$\left[\frac{1}{2^n}\right]^2 + \left[\frac{1}{2^{n+1}}\right]^2 = C^2$$

$$\frac{1}{2^{2n}} + \frac{1}{2^{2n+2}} = C^2$$

$$\frac{5}{2^{2n+2}} = C^2$$

$$\frac{\sqrt{5}}{2^{n+1}} = C$$

I don't know what the distribution will look like.