

## What are your chances of finding a four-leaf clover?

We know that this is not the warmest season for going outside and looking for four-leaf clovers but for Saint Patrick's Day we thought that we might deal with how "slim the pickings" are when you are looking for good luck.

A true 4-leaf clover is a member of white clovers (named for their flower) called *Trifolium Repens*. As the name suggests the leaves of these clover are normally 3-leafed.

But occasionally you can find a 4-leafed *trifolium repens*. It is said that you can find one 4-leafed white clover for every 10,000 normal 3-leafed clovers that you find. If you do find a 4-leafed clover you will supposedly have good luck.



We wondered how big an area you would have to search to look at 10,000 white clovers.

1. What do you think that you have to consider when defining an area of a field or lawn that might contain 10,000 clovers so that we might find one 4-leafed clover.
2. Take a guess about the size of the area that you would have to search to observe 10,000 clover stems.

Jim Frost, a statistician in Pennsylvania, was interested in the 4-leaf clover question. He and his daughter chose an area of his lawn that seemed densely covered in clover to investigate. They started small. They cut out a 6-inch square from a larger sheet of paper and laid it on the clover patch.



He and his daughter then picked all of the clover stems in that area and then counted their picked stems. In that 6" x 6" space they counted 200 clover stems.

Now of course, the density of Jim's experimental area won't be universally true of all clover patches but it seemed like a good place to start.

3. From their measurements, what size area (square inches) did they use that contained 200 clover stems?

4. How many square inches are in a square foot (12" x 12") \_\_\_\_\_ and what fraction of that square foot is the area that Jim and his daughter searched?

5. How many clover stems would you expect to pick in one square foot of his clover patch?
6. How big of an area do you calculate that it would take to pick 10,000 clover stems so that you would probably find a four-leaf clover?
7. Was that close to your guess?

Extension: Find your own area of clover (like 3 inches by 3 inches or 6 inches by 6 inches) and try to figure out how many clover stems should be in that area. Now count the clover and find your clover density. How does your clover count compare to Jim's count?

Sources: <https://www.almanac.com/content/clover-comeback>  
<https://statisticsbyjim.com/fun/probability-theory-helps-find-more-four-leaf-clovers/>  
[https://www.nrcs.usda.gov/Internet/FSE\\_PLANTMATERIALS/publications/idpmcpg8308.pdf](https://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/idpmcpg8308.pdf)