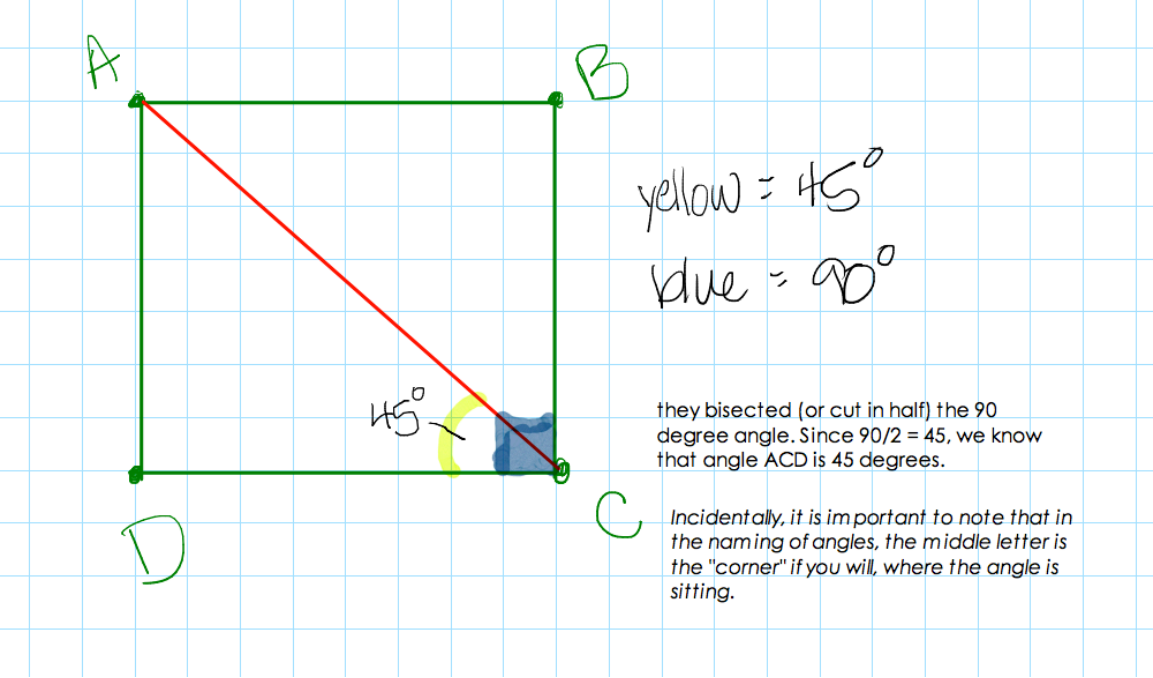
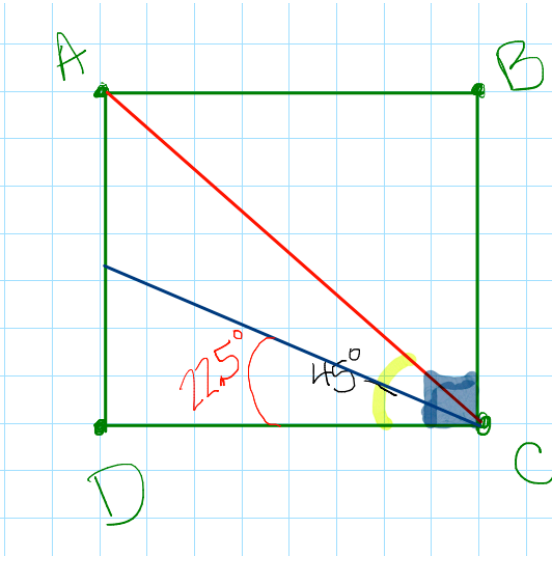
Let's start at the top.

19) This one is 45 degrees, because it is half of 90. You are right that half of 360 is 180, and you are also right that the figure is a square. You are further right that all the angles in a square equal 360. So congratulations! You have lots of things right. However, the question here is wanting to know about a specific angle. Let me see if I can draw you a picture.

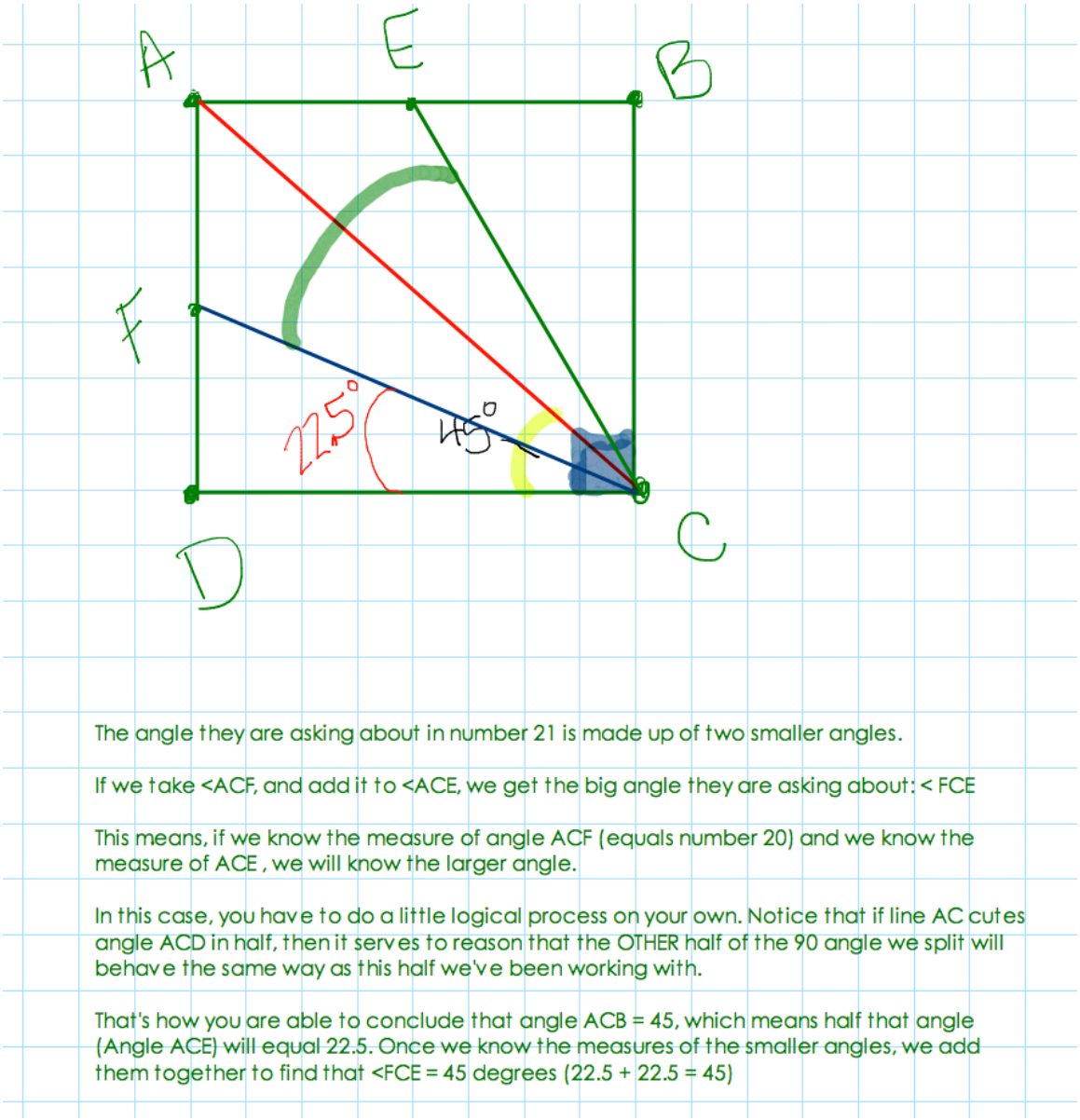


Number 20
Here, they are continuing to bisect angles, only this time they are cutting in half angle ACD. Since we found in number 19 that angle ACD is 45 degrees, we know that angle FCD is 45/2, or 22.5 degrees.



Number 21) Here they are choosing a larger angle that while not a bisecting angle, IS an angle we can figure out based on what we have found in numbers 19 and 20 (Note that all of these problems are building on each other intentionally).

Notice that if angle FCD is half of angle ACD, then the other half: Angle ACF must be half of ACD also. This means that <FCD = <ACF, both are 22.5 degrees. Why is this important? Well look at this figure:



The angle they are asking about in number 21 is made up of two smaller angles.

If we take <ACF, and add it to <ACE, we get the big angle they are asking about: < FCE

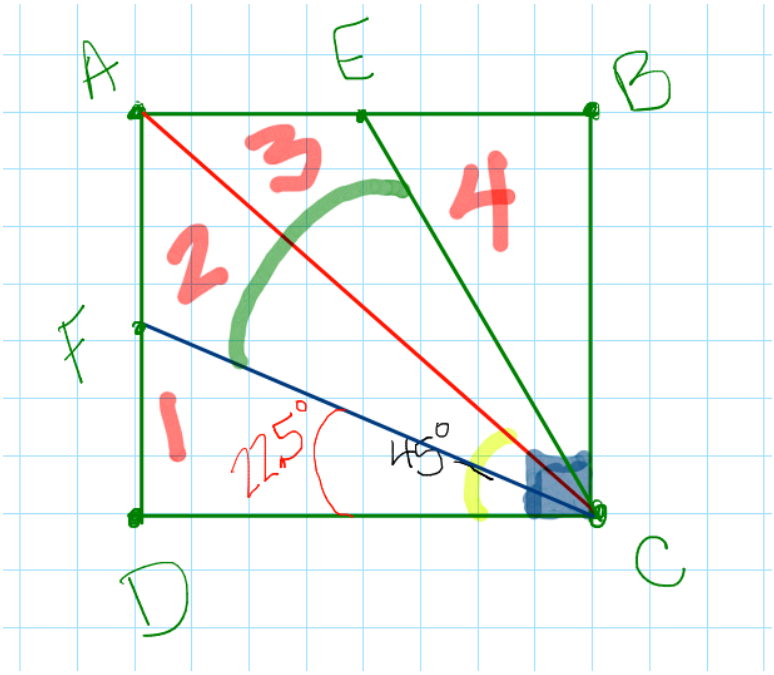
This means, if we know the measure of angle ACF (equals number 20) and we know the measure of ACE , we will know the larger angle.

In this case, you have to do a little logical process on your own. Notice that if line AC cutes angle ACD in half, then it serves to reason that the OTHER half of the 90 angle we split will behave the same way as this half we've been working with.

That's how you are able to conclude that angle ACB = 45, which means half that angle (Angle ACE) will equal 22.5. Once we know the measures of the smaller angles, we add them together to find that <FCE = 45 degrees (22.5 + 22.5 = 45)

Number 22) DCE is another addition angle. Meaning we have to add together smaller angles to figure it out (You could also subtract, I'll show you that in a minute).

Option 1 :Let's start by labeling these angles 1, 2, 3, and 4 for the sake of brevity.

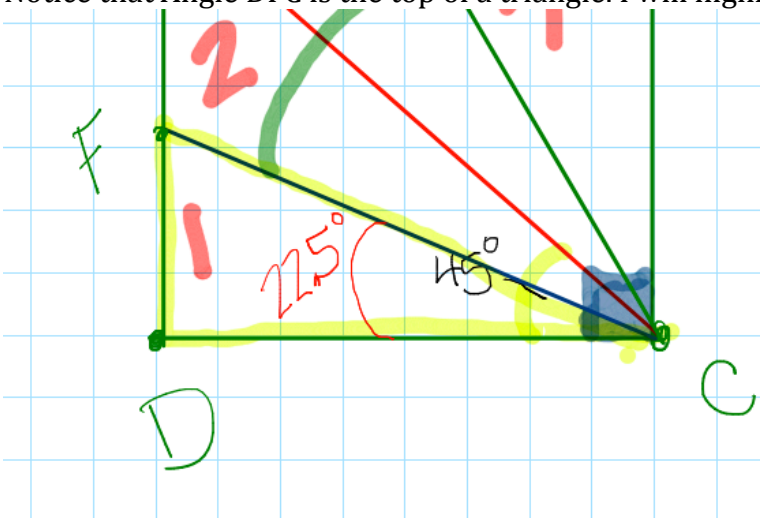


DCE = <1 + <2 + <3 = 22.5 + 45 (based on what we've found in 19-21). That makes DCE = 67.5 degrees

Now I mentioned a second option, which is subtraction.
You know the "whole" angle (the original right angle) equals 90 degrees. We also know by process of deduction that <4 = 22.5 degrees. So we can subtract 90 – 22.5 = 67.5 degrees. Either way is correct.

Number 23) Last , but never least, is angle DFC. This one asks you to apply what you know about triangles.

Notice that Angle DFC is the top of a triangle. I will highlight the triangle here:



We know that the three inside angles of a triangle add together to equal 180 (as you so correctly pointed out originally). So we use that information here. We know that the corner angle of a square equals 90 degrees. Number 19 found for us that the small angle of this triangle, <FCD (aka <1) Is 22.5 degrees. We can now calculate the value

of the remaining third angle, angle DFC.

180 – (22.5 + 90) = 180 – 112.5 = 67.5 degrees.

There are other ways to solve this problem, using many geometry theorems that will work. I have shown you the way that I would approach the problem. If you use another method, or have questions about alternate ways to work it, please let us know!

I hope this helps!

God Bless,

Cassidy Cash

The AskDrCallahan Team

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Homework Help