

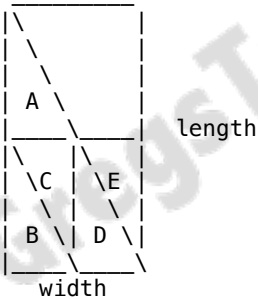
Hi, I'm Greg. I'm a NYC tutor! I love helping students. I tutor many subjects, assist with homework help, etc. I mainly specialize in specialized tests.

As it turns out, I haven't been able to get to do as many livestreams as I have in past years (yet, hopefully that changes). Therefore, I thought it would be fun to start a Problem Of The Day Series. I will put up a problem and leave it running for a while. You guys will then analyze it, and come up with possible solutions and alternative solutions on your own. I'll eventually post the answer in some manner.

For now we'll play it by ear how that will happen and for how long I'll leave up a problem. But right now I'm thinking of keeping the problem up maybe 2 hours minimum and maybe even in some cases 4 or 5 hours depending upon the dynamics and my situation. Unlike my AMA (Ask Me Anything) livestream sessions, I will not be checking in every few minutes although I may from time to time join into the discussion. Again, the idea is for you guys to discuss out the problem.

Please be respectful to each other in this endeavor and let's make this fun, educational and forward-thinking. Keep the comments within the spirit of what I'm doing here. Please email me at GregsTutoringNYC@gmail.com if needed.

HERE'S THE PROBLEM: <—  
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The above rectangle has a width of 6 and a length of 8. Triangles A, B, C, D, and E are congruent. What is the sum of the perimeters of all the triangles represented within the rectangle?

HERE'S THE SOLUTION:  
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Since triangles A, B, C, D, and E are congruent they are all the same triangles. Since the width of the rectangle is 6 then the midpoint of the width, 3, is the length of one of the legs of those triangles. Since the length of the rectangle is 8 then the midpoint of the length, 4, is the other length of one of the legs of those triangles.

The hypotenuse can be computed thus:

$$\begin{aligned} c^2 &= a^2 + b^2 \\ &= 3^2 + 4^2 \\ &= 9 + 16 \\ &= 25 \\ \therefore c &= 5 \end{aligned}$$

You may also know your Pythagorean Triples, as these are 3-4-5 right triangles!

We must count shared hypotenuses and shared legs separately as per the question.

That means each of A, B, C, D, E have perimeters of

$$\begin{aligned} 3 + 4 + 5 &= 12 \\ \therefore 12 \times 5 &= 60 \end{aligned}$$

We're not done yet though, as there is still one more triangle that is encompassed by triangles, A, B, C and D (but not E). Its legs are 6 and 8. Its hypotenuse can be computed as 10, or, by using a multiple x 2 of your 3-4-5 Pythagorean Triple as 6-8-10. The perimeter of that triangle is 24.

Further furthermore, there is still another triangle: E in combo with the unnamed trapezoid in the upper right hand corner. It too has a perimeter of 24.

$$\therefore 60 + 24 + 24 = 108$$

- Greg / GregsTutoringNYC@gmail.com LLAP ☺