



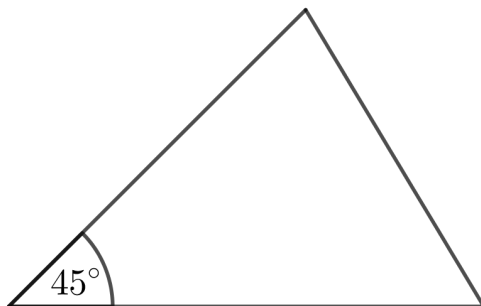
Problem of the Week

Problem C and Solution

Two Out of Three Angles

Problem

While measuring the angles in a triangle, Patricia found the measure of one of the angles is 45° . Once she had measured the other two angles, she noticed that the measures of these two angles are in the ratio 4 : 5. What is the measure of each of the other two angles?



Solution

Solution 1

Since the measure of the unknown angles are in the ratio of 4 : 5, then we can give the angles measures of $5n^\circ$ and $4n^\circ$.

Since the sum of the measures of the three angles in any triangle is 180° , then

$$45 + 4n + 5n = 180$$

$$4n + 5n = 135$$

$$9n = 135$$

$$n = 15$$

Therefore, the other two angles are $5n = 5(15) = 75^\circ$ and $4n = 4(15) = 60^\circ$.

Solution 2

Since the sum of the measures of the three angles in any triangle is 180° , then the sum of the measures of the two unknown angles in the triangle is $180^\circ - 45^\circ = 135^\circ$.

The measures of the two unknown angles are in the ratio 4 : 5, and so one of the two angles measures $\frac{5}{4+5} = \frac{5}{9}$ of the sum of the two angles, while the other angle measures $\frac{4}{4+5} = \frac{4}{9}$ of the sum of the two angles.

That is, the larger of the two unknown angles measures $\frac{5}{9} \times 135^\circ = 75^\circ$, and the smaller of the unknown angles measures $\frac{4}{9} \times 135^\circ = 60^\circ$.

Therefore, the other two angles are 75° and 60° .