

The Work Problem

Problem-of-the-Week

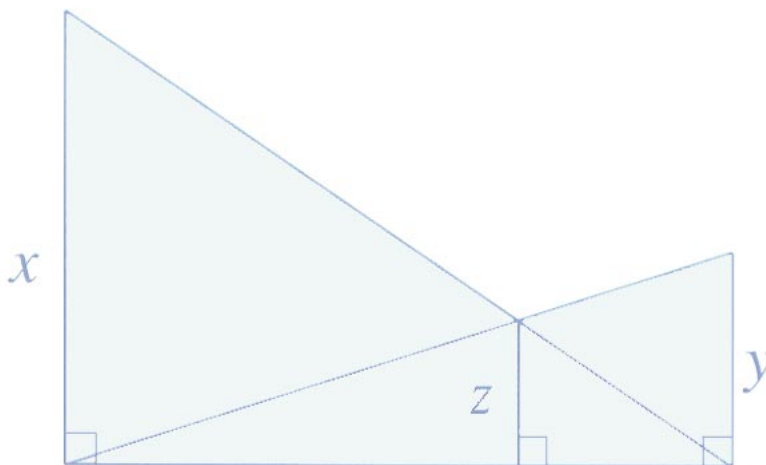
The Problem

Let's say that you can complete a job in x hours. Your friend can do the same job in y hours. And, working together, you can finish the job in z hours. The equation shows how x , y , and z are related.

$$\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$$

This same relationship among x , y , and z is shown in the two overlapping right triangles in the figure below.

Prove that the relationship is true for the triangles. Then explain how it also can be used for the work problem.



Strategies and Hints

1. You will need to add some letters to the figure in order to discuss the triangles. Add any letters you wish.
2. Notice that the two triangles at the right are similar. Write a proportion to help show how z is related to y . Then do the same for z and x .
3. Add the two proportions you just wrote. The last step is to divide by z .

