Working Together

By At Right Angles | Aug 16, 2020

“Manveen can paint a room in 3 hours and Allen can paint it in 6 hours. How much time will it take them to paint the room if they work together?”

Students often find such problems challenging. While using the standard computation (3 × 6)/ (3 + 6) = 2 does produce the correct answer immediately, it is unaccompanied by understanding. Perhaps we can lead students to understand such problems if we introduce the concept with whole numbers. To this end, suppose we have a machine that makes 2 items (for example, sweaters) in an hour and a second machine that makes 4 items in an hour and we ask, “How many items are made in one hour when both machines are running?” We can write the solution as: 2 items/hour + 4 items/hour = 6 items/hour. We are really only adding 2 items and 4 items to obtain 6 items and expressing this as an hourly output. We can then easily calculate how long it will take to make, say, 24 items (24 ÷ 6, or 4 hours).

Returning to the original problem, Manveen has an output of 1 room/3 hours, which can be expressed as (1/3 room)/hour, and likewise Allen has an output of (1/6 room)/hour, and just as we did with items, we add (1/3 room)/hour and (1/6 room)/hour to obtain a combined hourly output of (½ room)/hour. We then express this final fraction using a numerator of 1, i.e., as 1 room/2 hours, which means that 1 room can be painted in 2 hours when they are working together. We want a numerator of 1 because we want 1 complete task. Looking first at an example with an hourly output more than 1 can help students understand problems in which the hourly output is less than one.

What do you think?

Have you encountered challenges that students face in solving these problems through the traditional way? Is this better: mathematically and pedagogically?

Share your thoughts at AtRiA.editor@apu.edu.in

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