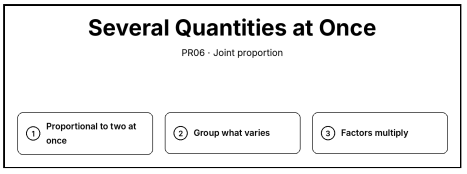
Several Quantities at Once: teacher script

PR06-V1 · PR06 Joint proportion · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 65 seconds as a video.

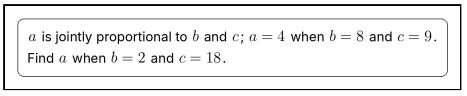
01



Say. Joint proportion. A quantity can be proportional to two others at once. Group what varies on one side. And remember, factors multiply.

Draw. Write the title “Several Quantities at Once” and the steps: 1. Proportional to two at once; 2. Group what varies; 3. Factors multiply.

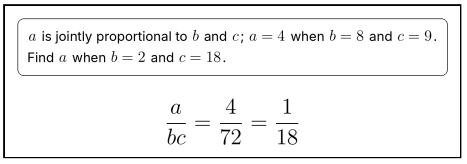
02



Say. a is jointly proportional to b and c, and a is 4 when b is 8 and c is 9. Find a when b is 2 and c is 18.

Draw. Clear the board. Write “a is jointly proportional to b and c; a = 4 when b = 8 and c = 9. Find a when b = 2 and c = 18.” in a box at the top.

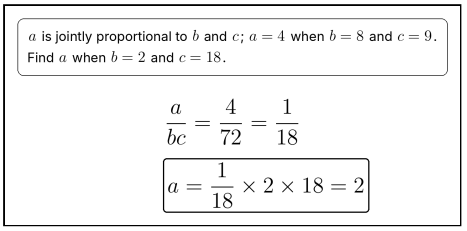
03



Say. a over b c stays the same: 4 over 72, which is 1 over 18.

Draw. Write a/(bc) = 4/72 = 1/18 on the next line.

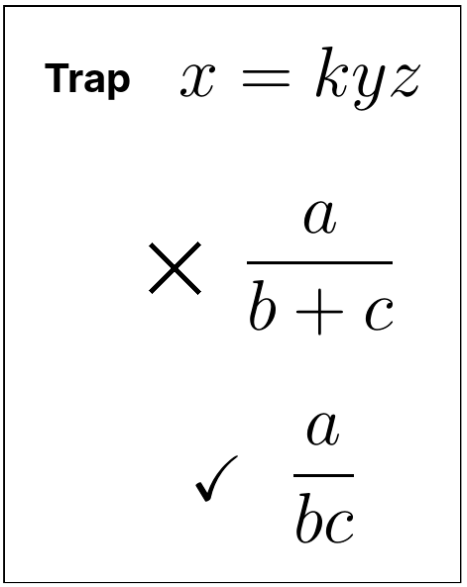
04



Say. So a is 1 over 18 times 2 times 18: a is 2.

Draw. Write a = 1/18 × 2 × 18 = 2 and box it on the next line.

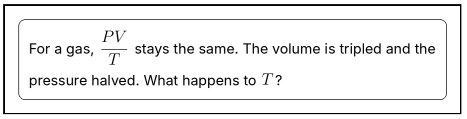
05



Say. Watch for the trap: adding. Joint proportion multiplies.

Draw. Clear the board. Write “Trap” and x = kyz. Below, write a/(b + c) and cross it out ×. Then write a/(bc) with a tick ✓.

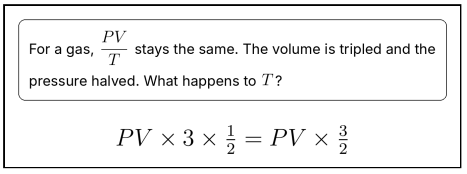
06



Say. For a gas, P V over T stays the same. The volume is tripled and the pressure is halved. What happens to the temperature?

Draw. Clear the board. Write “For a gas, PV/T stays the same. The volume is tripled and the pressure halved. What happens to T?” in a box at the top.

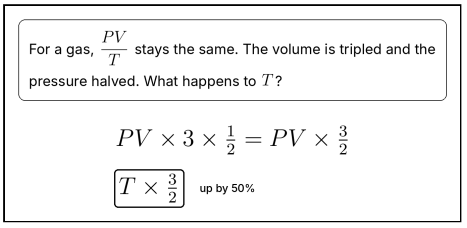
07



Say. P V is multiplied by 3 times one half, that is three halves.

Draw. Write PV × 3 × 1/2 = PV × 3/2 on the next line.

08



Say. So T is multiplied by three halves too: up by 50 percent.

Draw. Write T × 3/2 and box it on the next line. Beside it, write “up by 50%”.

09

Trap $\dfrac{PV}{T} = k$

$\times\ T \times \frac{2}{3}$

✓ $T \times \frac{3}{2}$

Say. Watch for the second trap: T goes with P V. When P V grows, so does T.

Draw. Clear the board. Write “Trap” and PV/T = k. Below, write T × 2/3 and cross it out ×. Then write T × 3/2 with a tick ✓.

10

Your turn

Group what varies.
Factors multiply; they don’t add.

Say. Now it is your turn. Group what varies, and multiply the factors.

Draw. Point to today’s activity: Group what varies. Factors multiply; they don’t add.