What to bring to class:
Ask students to bring PM 4A and 5A.

7.1 Ratios and Proportions

GOAL: To define ratio

Have class open Sing 5A to pg 71.

Start reading together. Have students fill in blanks.

Call attention to

- Movement from Concrete ⇒ Pictorial
- Every problem is in a new setting

page 76, simplify by crossing out

~~4~~ : ~~10~~
2 : 5

[AVOID WRITING RATIO IN FRACTION NOTATION!]

– not yet anyway –

- Page 77-78, note teacher's solutions
- Page 77, child hints at definition

7 : 4 means 7 units to 4 units

⇒ 7 and 4 are in the same unit!

Page 79 Get student at the board!

Send 3 or 4 up to the board, assign them each 1 problem from practice 5A

Suggestion: 4, 5, 7

Give 2 minutes for student to try to draw teacher solutions.

Then, instructor reads problem, and class works together to build T.S. (with student at board).

read pages 80-81, note

- ratio doesn't appear to be a number.
- Do problems 4, 6, 9 of practice 5B quickly - class helps build pictures!

Def: A proportion is a statement that two ratios are equivalent

$2 : 3 = 10 : \square$

Note that

- the unit is the same for both quantities.

Ex: Ratio of oranges to apples is 2 : 3

really means

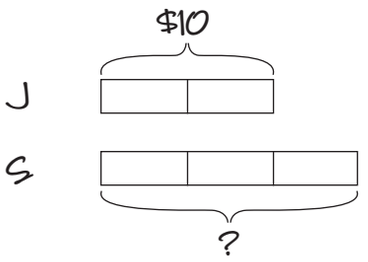
2 objects to 3 objects.

Ex: 50 miles to 1 hour is not a ratio, called a rate.

- For a specific situation, there is a unit which measures both quantities.

Ex: The ratio of Jims money to Sam's is 2 : 3.

If Jim has $10, how much does Sam have?



2 units = $10

1 unit = $5

3 units = $15

Sam has $15.

[SAY: Here the unit is a 5 dollar bill. Jim has 2 five dollar bills, Sam has 3. 2 : 3 = 10 : 15, but each is measured w/ different units: a five vs $1.]

Def: We say the ratio between two quantities is 2 : 3 if there is a unit so that the 1st quantity measures 2 units and the second measures 3 units.

Ratios represented as fractions

Because ratios have many equivalent representations like fractions (2 : 3 = 4 : 6 = 12 : 18 = etc. . . .), they are often written as fractions:

Turn to page 24 of Sing 6A, read and discuss problems 6–16 quickly.

Note:

- ratios can be converted into
  - fraction of total $2:3 \rightsquigarrow \frac{2}{5}$ (problem 6)
  - turned into a scale factor $2:3 \rightsquigarrow \frac{2}{3}$ (problem 7, 8)
- Fractions can be used to write an equivalent ratio. (prob 9)
- After a ratio is turned into a fraction, the fraction is a number, but the ratio is not. This is because we specified a whole unit in order to write it as a fraction.

Thus,

"ratios are fractions that are waiting for a standard unit to be specified."

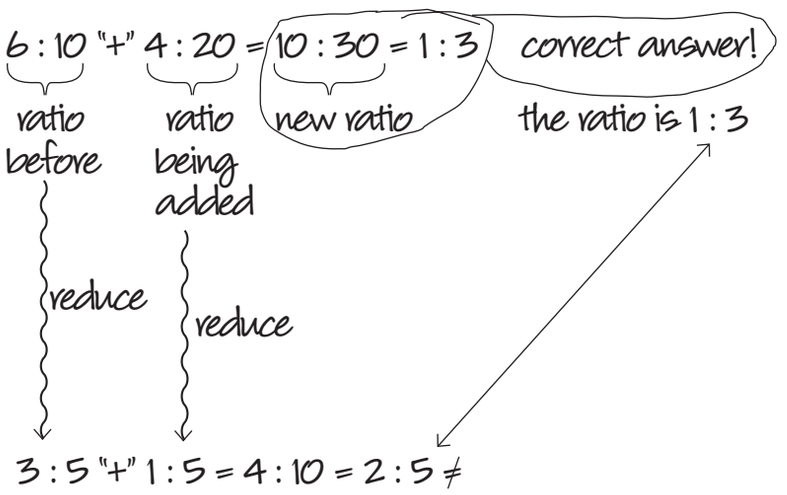
This makes ratios more versitile then fractions, but we cant think of them as numbers.

One more time to be sure: ratios are not numbers!

If time, go over problems in Practice 3A of Sing 6A (Suggestion: 4, 7, 8)

HW Read §7.1 and do HW set 30

Ex: A bag contains 6 white and 10 red marbles. 4 white marbles and 20 red marbles were added to the bag. What is the ratio of white to red marbles in the bag?



No matter how you try, you can't find a way to "add" (or −, ×, ÷). Ratios are not #'s !