

DAY 7: Writing Proportions

Materials

Copies: 7.1 Solving Proportions
7.2 Proportional or Not? II (Teacher copy only)
7.3 Double-Sided Number Line for Writing Proportions
Ticket Out the Door Day 7

Supplies: Calculators (1 per person or pair)

Objective

Students will learn to use a double-sided number line to set up a proportion from a word problem.

Student Talk Strategy

Think-Pair-Share for 7.2
Pair-Share for 7.3

Academic Language Use

Proportional- two lists of numbers are proportional if the numbers in one list are constant multiples of the numbers in the other list, with the same constant “of proportionality” for all the numbers. In this unit, students will come to understand this concept by doing activities (in which some are proportional and others are not) and comparing the tables and graphs to notice the constant multiplier.

Cross-products- a method for solving a proportion by setting the diagonals equal to one another.

Activity Notes

10 minutes: Practice Solving Proportions

Pass out activity sheet 7.1 and calculators. Give the students 2 minutes to solve #1 on their own and then have the discuss their answer with a neighbor while a student you select comes to the front to share his work. Give the students the remaining time to work on the activity sheet. Set the timer for 5 minutes in which the students need to work alone and then allow them to work with a partner (if they choose).

10 minutes: Proportional or Not?

Put students into groups of 2. Explain that you will be putting up a scenario (word problem) and they need to decide if the data are proportional or not. To do this, once you put up a problem from activity sheet 7.2, set the timer for 30 seconds for the students to think silently, and then allow 30 seconds to discuss with their partner. At the end of the minute, have each pair vote in front of their chests by showing thumbs up for “yes, it is proportional”, thumbs down for “no, it is not proportional” and a sideways thumb for “we’re not sure”. Make sure to discuss each scenario by selecting students to share their reasoning.

Note: All problems are proportional except #'s 3, 6 & 8.

30 minutes: Using the Double-Sided Number Line to Write Proportions

Pass out activity sheet 7.3. Explain to the class that they will now be applying all they have learned to solve for a missing number in a proportion that comes from a word problem. Have a volunteer read problem #1 (note: this sheet includes all the problems that were proportional from 7.2) and three new ones.) Tell the students you will give them 30 seconds to think about whether they can use a proportion to solve and then take a vote (as you did in 7.2 above). Select a student at random to tell you what the two “things” you are comparing are in this scenario (i.e., money, laps, distance, etc). Show the students how to draw a number line to represent each “thing”. For #1, this will be dollars and pounds.

Dollars (\$)



pounds

Note: It does not matter which unit is on top or bottom.

Ask the students what number they should put at the left end of each number line (it should be 0) and add this onto your picture.

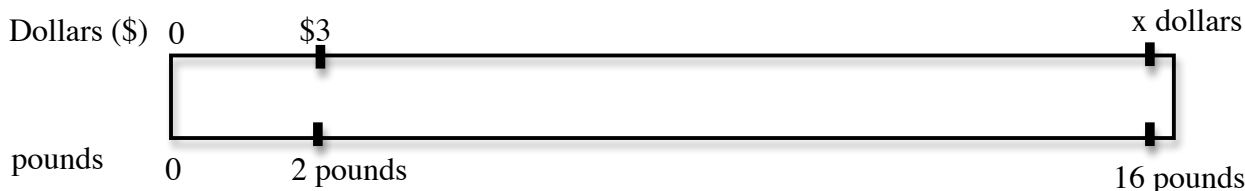
Dollars (\$) 0



pounds

0

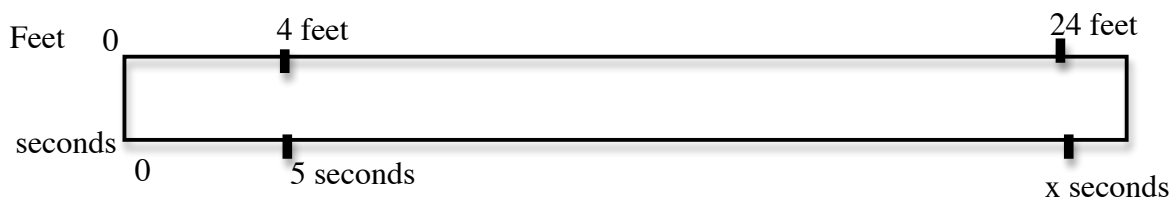
Select a student at random to tell you what other information the problem gives. In this case, we are told it is \$3 for 2 pounds of apples and we want to know how much it will cost for 16 pounds? Select another student, at random, to tell you what numbers go on the pound line and about where. Select another student to tell you what numbers go on the Dollars line and where. Select a final student to tell you what it is you’re looking for and mark this with an x (or other variable).



Ask a few questions to ensure the students understand, such as “Why is the 16 on the bottom line?” “How did I know where to put the \$3?” Then, explain to the class you will be trying to come up with an estimate for x. Ask the class for ideas on how to get a decent estimate. Make sure the class agrees that the number must be greater than 3.

Once you have some ideas on estimating and have picked a class estimate (note: the purpose of estimating is to help the students notice a ridiculous answer they may get from arithmetic errors), give the students 30 seconds to look at the diagram (above) and look for the proportion. Have them turn to their neighbor to tell them what proportion they see. Then, select a few students to share what they see and how they saw that. While there are many correct answers and you need to validate all of those, the most

common answer will be to see $\frac{\$3}{2lb.} = \frac{\$x}{16lb.}$. Give the students a minute to solve the proportion (either using cross-products or equivalent fractions). Direct the students' attention to problem #2 and, again, have a volunteer read the problem. Give them 30 seconds to think silently and then vote if the problem can be solved using a proportion. Have the students draw and label a double number line for this problem (one line should be feet and the other seconds). Give them 45 seconds to do this and then have them share with a neighbor. Have a volunteer share what they wrote. Then ask the students to think about what information they have and fill in those numbers on their picture. See below for picture. Follow the same process of allowing 45 seconds alone and then having them check with a partner before you have a volunteer share with the class. Now give the students 30 seconds to predict what x will be. Finally, give the students 45 seconds to record the proportion they see and then have them check with a neighbor. After a student has shared, let the students solve the proportion. Give the students the remaining time to work with a partner on the problems. Remind them that for each problem, you want a picture with labels, and estimate, a proportion and a solution. While the class is working, circulate to question students to help them get started or to see any errors. Some good questions are, "What are the two things being compared?" "What number can you put on the left end of the # line?" "What other information does the problem tell you?" Find groups who are finishing fast and have them put their work up on the board so others can use it as help when needed.



10 minutes: Ticket out the Door

Pass out the Ticket out the Door and collect it as soon as each student finishes (so that you can discuss mistakes with students as they turn it in).