Your Starting Point

- Reflect on your previous experience with ratio tables and tape diagrams.
- **BLUE** Stickie: List examples of how you have used **ratio tables** in the past. (If you haven't, that's okay too!)
- **GREEN** Stickie: List examples of how you have used **tape diagrams** in the past. (If you haven't, that's okay too!)
- Place your stickies on the two Likert scales on the wall, according to the descriptions below:

  1: "What's that?"

  2: "I've seen them before, but haven't used them."

  3: "I know how to use them, but haven't used them with my students."

  4: "I've used them a few times with students."

  5: "I love them! I use them whenever I can!"

Ratio Tables and Tape Diagrams #notjustforRP

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Outcomes

- Understand how to use ratio tables and tape diagrams to develop proportional reasoning
- Explore how ratio tables and tape diagrams can be used to build procedural fluency from conceptual understanding in other content domains, including the Number System and Equations and Expressions.

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WARNING!!!!

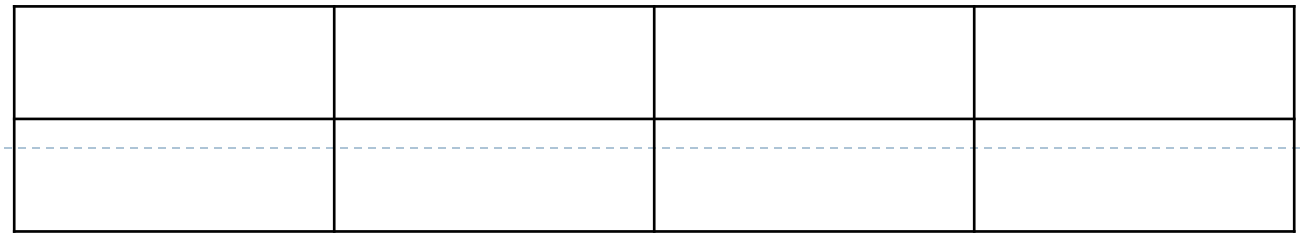
- These questions lack a worthwhile task-like feel.
- Students may prefer other tools.

Standards Highlighted

- **6.NS.A.1.** Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.
- **6.EE.B.7** Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which *p*, *q*and *x* are all nonnegative rational numbers.
- **7.EE.B.4a** Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently.
- **8.EE.C.8** Analyze and solve pairs of simultaneous linear equations.

What is a ratio table?

- **Ratio tables** are graphic organizers that show how two variable quantities are related.
- They are a great way to organize information to help students identify and generate equivalent ratios.



Building from Multiplication Tables

- Use a tool that students are already familiar with to create a foundation.
- A multiplication table contains an infinite number of ratio tables.
- If you select 2 rows in a multiplication table, you can put them together to make a ratio table.
- Uplift multiplicative reasoning

Identifying Equivalent Ratios

- Explore and create ratio tables within a multiplication table to identify equivalent ratios…

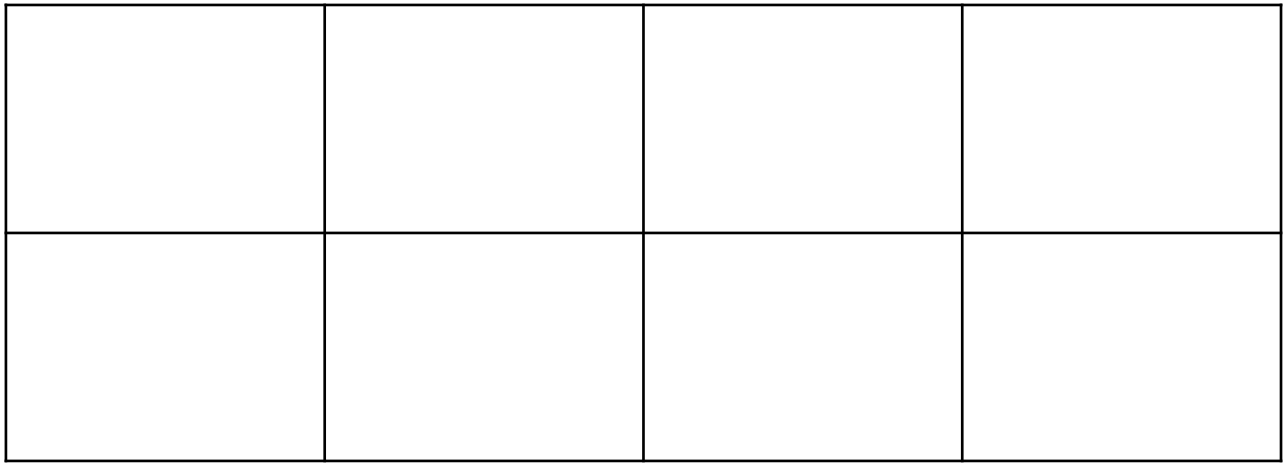
	1	2	3	4	5	6	7	8
1	1	2	3	4	5	6	7	8
2	2	4	6	8	10	12	14	16
3	3	6	9	12	15	18	21	24
4	4	8	12	16	20	24	28	32
5	5	10	15	20	25	30	35	40
6	6	12	18	24	30	36	42	49
7	7	14	21	28	35	42	49	56
8	8	16	24	32	40	48	56	64

Developing Proportional Reasoning

- Ratio tables help students develop conceptual understanding of proportional relationships.
- Ratio tables must be explored prior to introducing the standard algorithm to solve proportions.

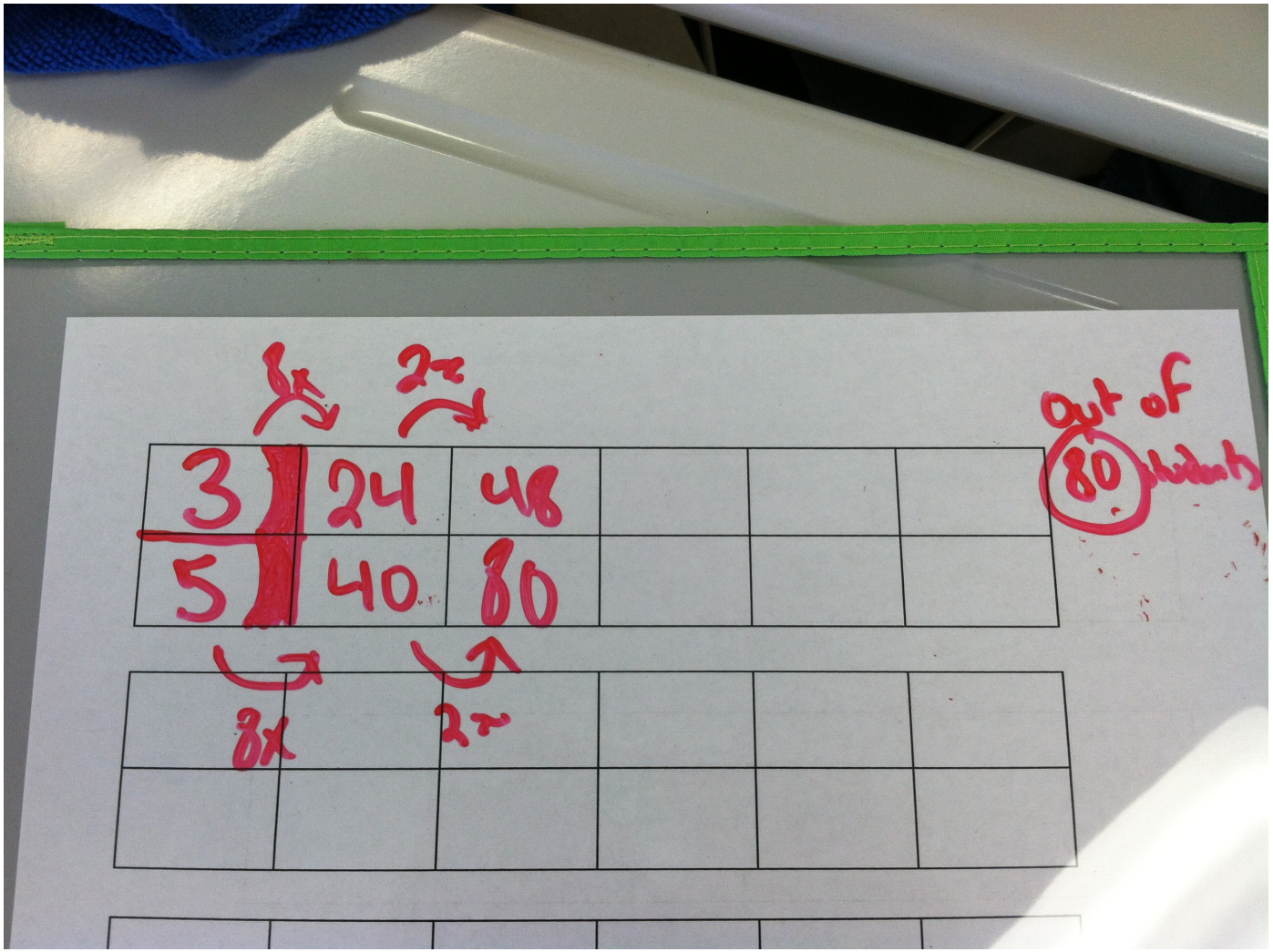
Try it using a Tape Diagram!

- If 3 out of 5 students prefer chocolate ice cream, how many out of 80 students prefer chocolate ice cream?



Katie's Explanation

Alternate Solution:



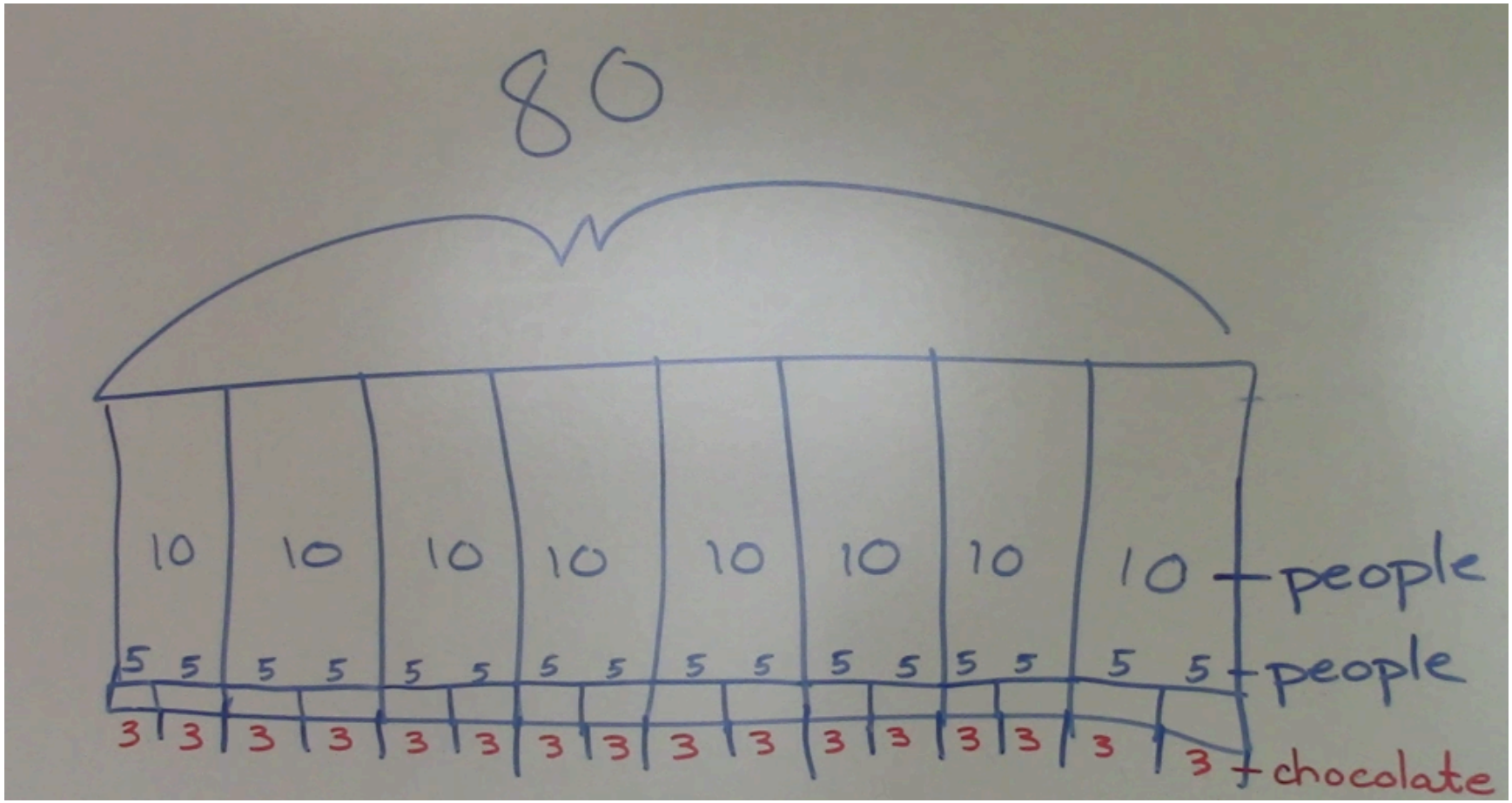
What is a tape diagram?

A drawing that looks like a segment of tape, used to illustrate number relationships. Also known as a strip diagram, bar model, fraction strip, or length model. (CCSS Glossary)

Try it Using a Tape Diagram!

- If 3 out of 5 students prefer chocolate ice cream, how many out of 80 students prefer chocolate ice cream?

Possible Solution:



Simon's Explanation:

Now you try…

- Shelly biked 21 miles in 4 hours.

Part A:

What is Shelly's average speed in miles per hour? Use a tape diagram to solve this problem.

Part B:

At the same rate, how far will Shelly travel in 6 hours? Use a ratio table to solve this problem.

Adapted from PARCC item (6.RP.3)

Part A:

- Shelly biked 21 miles in 4 hours.

Part A:

What is Shelly's average speed in miles per hour? Use a tape diagram to solve this problem.

21 miles

5.25	5.25	5.25	5.25

Shelly averages 5.25 miles per hour.

Adapted from PARCC item (6.RP.3)

Part B:

At the same rate, how far will Shelly travel in 6 hours? Use a ratio table to solve this problem.

		÷2	×3
miles	21	10.5	31.5
hours	4	2	6
		÷2	×3

Shelly will travel 31.5 miles in 6 hours.

Adapted from PARCC item (6.RP.3)

Ratios + Division

$$8 \div 2$$

$$\frac{8}{2}$$

Ratio Tables with 6.NS.A.1

- Jaylin is making mini pizzas. She has 12 cups of cheese. If each pizza requires $\frac{2}{3}$ cup of cheese, how many pizzas can she make?

	×3	÷2
12	36	18
$\frac{2}{3}$	2	1
	×3	÷2

$$\frac{18}{1} = 18$$

Jaylin can make 18 pizzas.

Ratio Tables for 6.NS.A.1

- The bathrooms in a new school building are being painted. There is a total of $5\frac{1}{2}$ gallons of paint.

- If each bathroom requires $\frac{2}{3}$ of a gallon of paint, how many bathrooms can be painted?

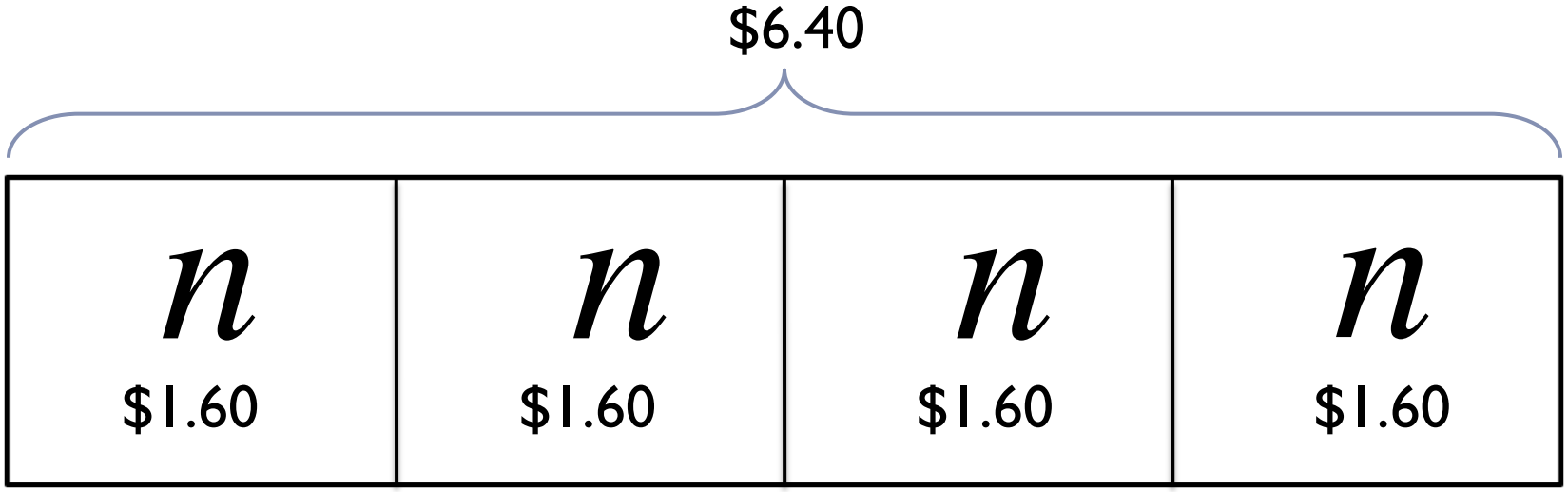
×2		×3
$\frac{11}{2}$	11	33
$\frac{2}{3}$	$\frac{4}{3}$	4
×2		×3

$$\frac{33}{4} = 8\frac{1}{4}$$

- Eight bathrooms can be painted.

Tape Diagrams for 6.EE.7b

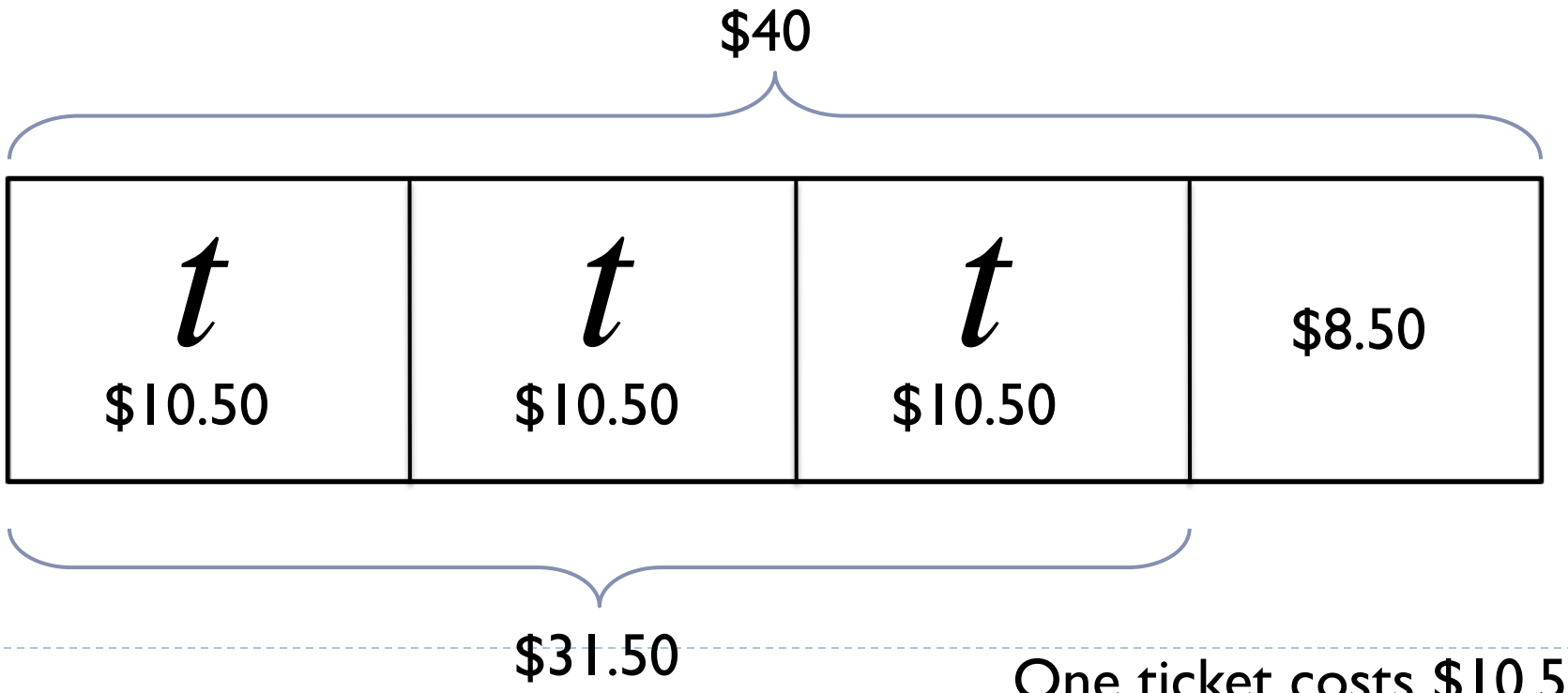
- Terri bought 4 notebooks for $6.40. What is the price, in dollars, of 1 notebook?



- *Adapted from PARCC item (6.EE.7b)*

Tape Diagrams with 7.EE.4a

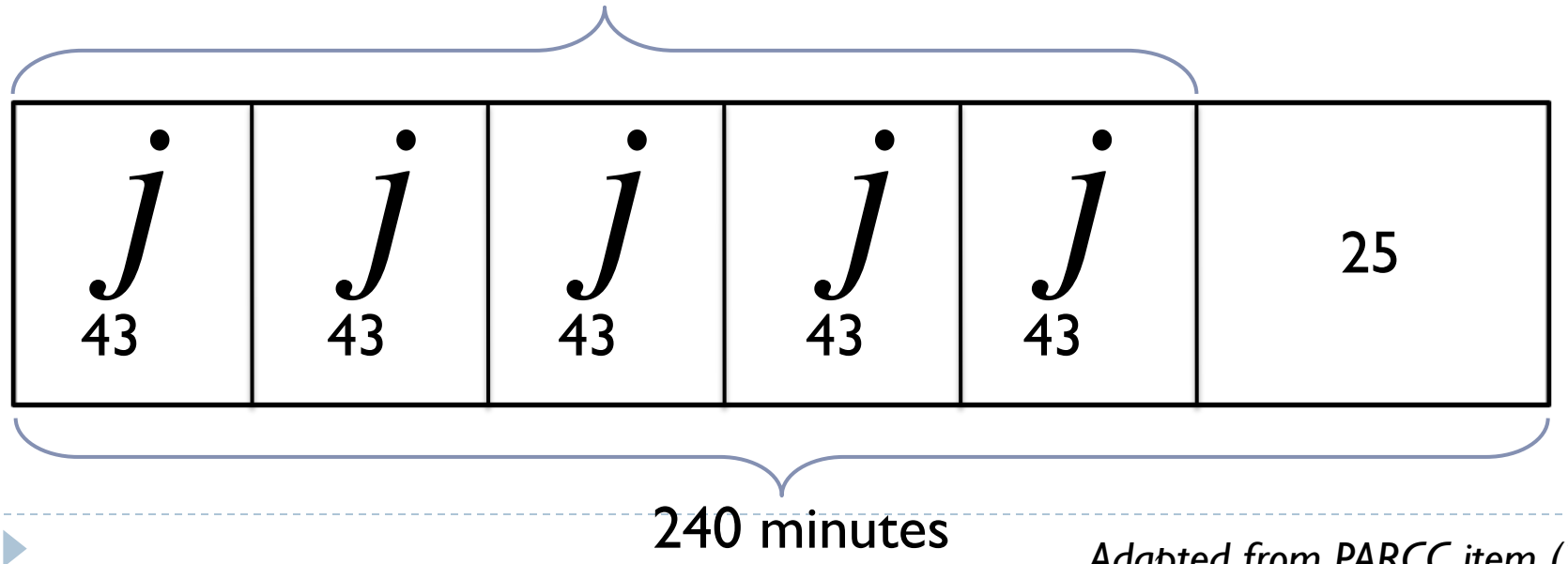
Aiden spent $40 at the movie theatre. He spent $8.50 on concessions and bought three movie tickets. Determine the cost of one movie ticket using a tape diagram.



One ticket costs $10.50.

Tape Diagrams with 7.EE.4a

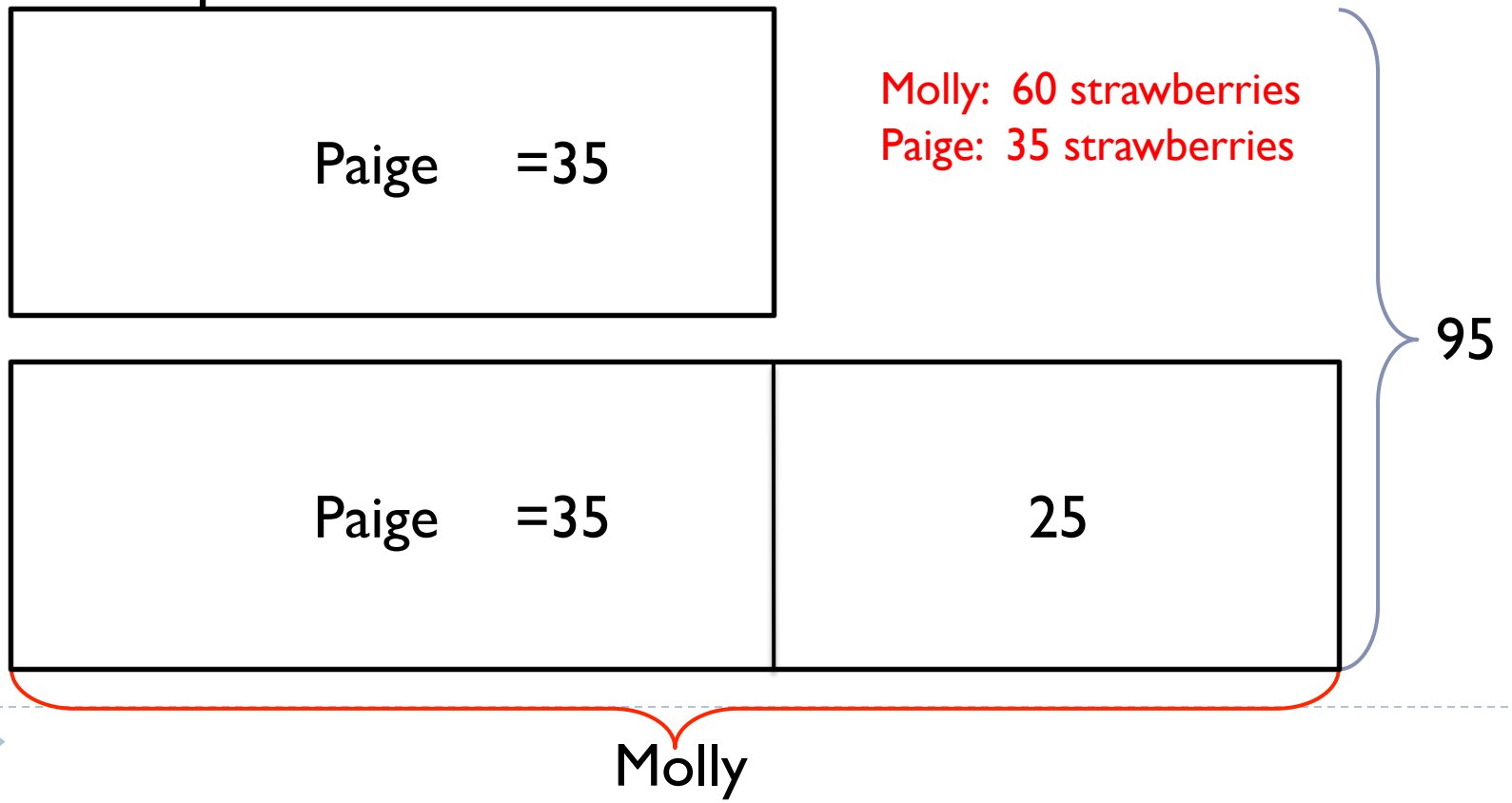
- Sal exercised by stretching and jogging 5 days last week.
  - He stretched for a total of 25 minutes during the week.
  - He jogged for an equal number of minutes each of the 5 days.
  - He exercised for a total of 240 minutes.
- Determine the number of minutes Sal jogged each day last week.



Adapted from PARCC item (7.EE.4a)

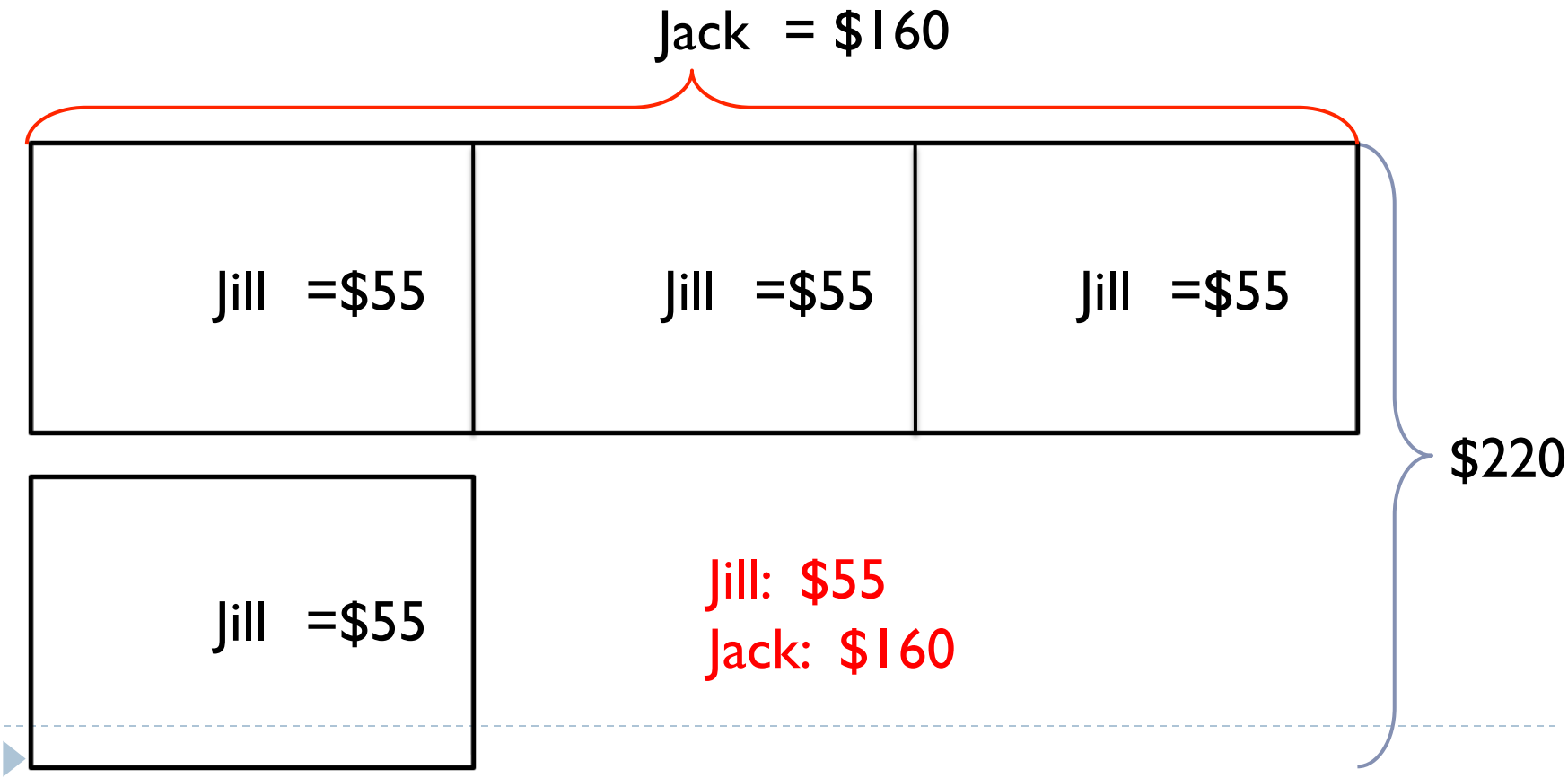
Tape Diagrams with 8.EE.C.8

- Molly and Paige went strawberry picking. Together they picked 95 strawberries. If Molly picked 25 more strawberries than Paige, how many strawberries did they each pick?



Tape Diagrams with 8.EE.C.8

- Jack and Jill went shopping. Jack spent three times as much as Jill. If they spend a total of $220 altogether, how much did they each spend?



In Conclusion:

- Add ratio tables and tape diagrams to their toolbox
- Encourage your students to use multiple ways to model their solutions
- Celebrate the variety of pathways to a solution

Tweet It!

- Create a Tweet (in 140 characters or less) describing how you will use ratio tables and tape diagrams in your classroom.
- Use #notjustforRP

Thank you for attending our session!

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