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Unit 2, Lesson 6: Introducing Double Number Line Diagrams

Let's use number lines to represent equivalent ratios.

6.1: Number Talk: Adjusting Another Factor

Find the value of each product mentally.

$$(4.5) \cdot 4$$

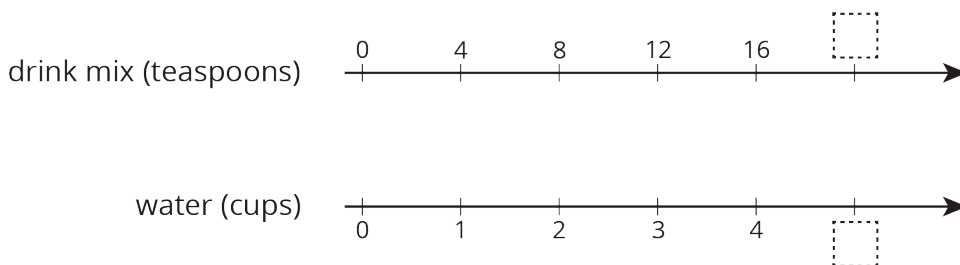
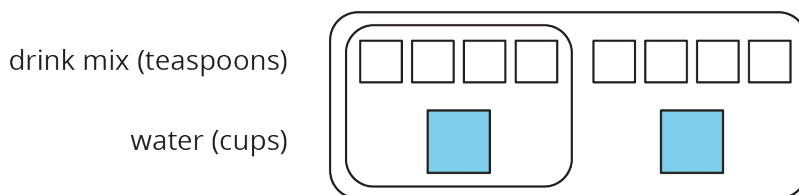
$$(4.5) \cdot 8$$

$$\frac{1}{10} \cdot 65$$

$$\frac{2}{10} \cdot 65$$

6.2: Drink Mix on a Double Number Line

The other day, we made drink mixtures by mixing 4 teaspoons of powdered drink mix for every cup of water. Here are two ways to represent multiple batches of this recipe:



1. How can we tell that 4 : 1 and 12 : 3 are equivalent ratios?

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2. How are these representations the same? How are these representations different?

3. How many teaspoons of drink mix should be used with 3 cups of water?

4. How many cups of water should be used with 16 teaspoons of drink mix?

5. What numbers should go in the empty boxes on the **double number line diagram**?
What do these numbers mean?

Are you ready for more?

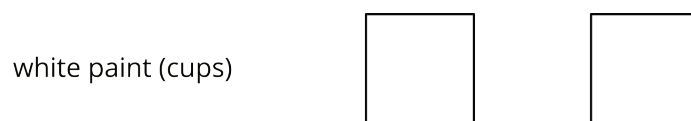
Recall that a *perfect square* is a number of objects that can be arranged into a square. For example, 9 is a perfect square because 9 objects can be arranged into 3 rows of 3. 16 is also a perfect square, because 16 objects can be arranged into 4 rows of 4. In contrast, 12 is not a perfect square because you can't arrange 12 objects into a square.

1. How many whole numbers starting with 1 and ending with 100 are perfect squares?

2. What about whole numbers starting with 1 and ending with 1,000?

6.3: Blue Paint on a Double Number Line

Here is a diagram showing Elena's recipe for light blue paint.

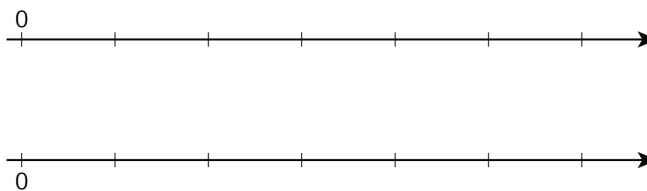


1. Complete the double number line diagram to show the amounts of white paint and blue paint in different-sized batches of light blue paint.

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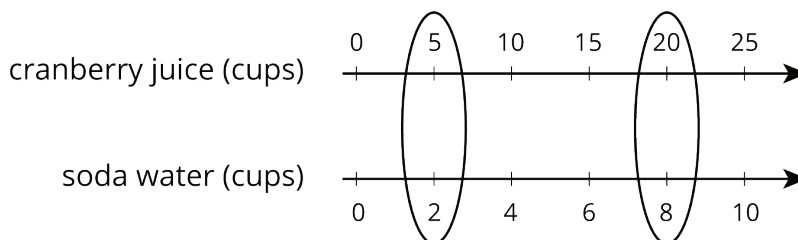
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2. Compare your double number line diagram with your partner. Discuss your thinking. If needed, revise your diagram.
3. How many cups of white paint should Elena mix with 12 tablespoons of blue paint? How many batches would this make?
4. How many tablespoons of blue paint should Elena mix with 6 cups of white paint? How many batches would this make?
5. Use your double number line diagram to find another amount of white paint and blue paint that would make the same shade of light blue paint.
6. How do you know that these mixtures would make the same shade of light blue paint?

Lesson 6 Summary

You can use a **double number line diagram** to find many equivalent ratios. For example, a recipe for fizzy juice says, “Mix 5 cups of cranberry juice with 2 cups of soda water.” The ratio of cranberry juice to soda water is 5 : 2. Multiplying both ingredients by the same number creates equivalent ratios.



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This double number line shows that the ratio $20 : 8$ is equivalent to $5 : 2$. If you mix 20 cups of cranberry juice with 8 cups of soda water, it makes 4 times as much fizzy juice that tastes the same as the original recipe.

Lesson 6 Glossary Terms

- double number line diagram

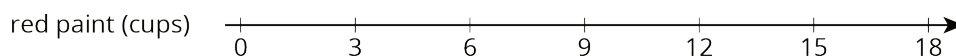
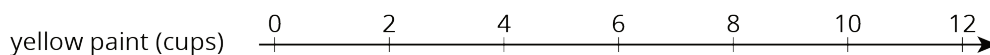
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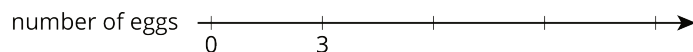
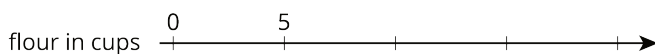
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Unit 2, Lesson 6: Introducing Double Number Line Diagrams

1. A particular shade of orange paint has 2 cups of yellow paint for every 3 cups of red paint. On the double number line, circle the numbers of cups of yellow and red paint needed for 3 batches of orange paint.



This double number line diagram shows the amount of flour and eggs needed for 1 batch of cookies.



a. Complete the diagram to show the amount of flour and eggs needed for 2, 3, and 4 batches of cookies.

b. What is the ratio of cups of flour to eggs?

c. How much flour and how many eggs are used in 4 batches of cookies?

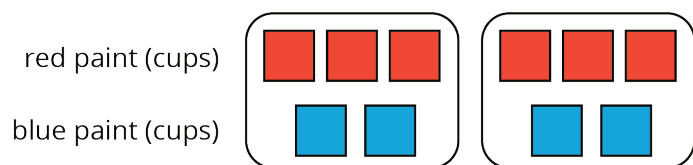
d. How much flour is used with 6 eggs?

e. How many eggs are used with 15 cups of flour?

2.

3. Here is a representation showing the amount of red and blue paint that make 2 batches of purple paint.

a. On the double number line, label the tick marks to represent amounts of red and blue paint used to make batches of this shade of purple paint.

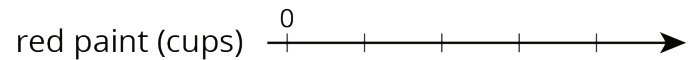


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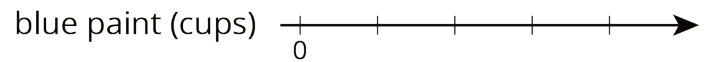
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b. How many batches are made with 12 cups of red paint?



c. How many batches are made with 6 cups of blue paint?

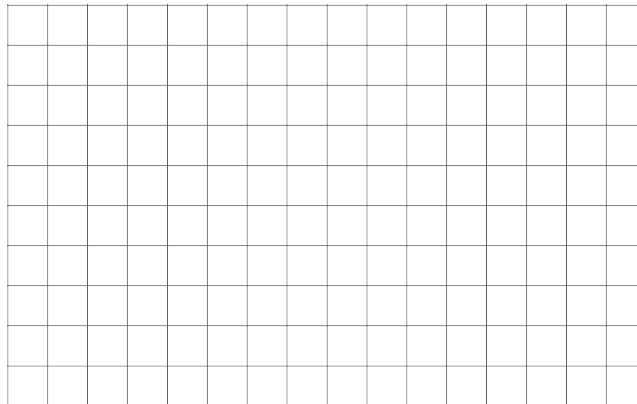


4. Diego estimates that there will need to be 3 pizzas for every 7 kids at his party. Select **all** the statements that express this ratio.

- A. The ratio of kids to pizzas is 7 : 3.
- B. The ratio of pizzas to kids is 3 to 7.
- C. The ratio of kids to pizzas is 3 : 7.
- D. The ratio of pizzas to kids is 7 to 3.
- E. For every 7 kids there need to be 3 pizzas.

(from Unit 2, Lesson 1)

5. a. Draw a parallelogram that is not a rectangle that has an area of 24 square units. Explain or show how you know the area is 24 square units.

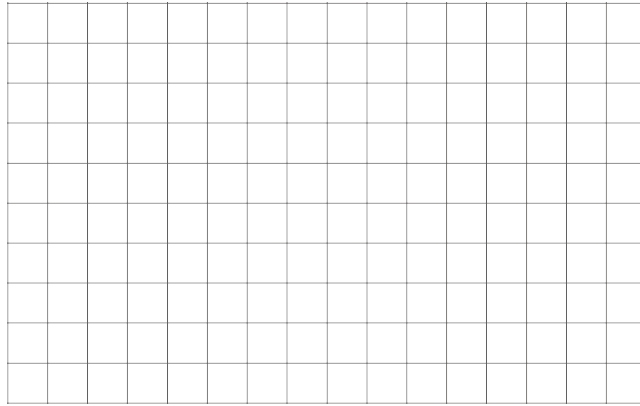


b. Draw a triangle that has an area of 24 square units. Explain or show how you know the area is 24 square units.

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(from Unit 1, Lesson 6)