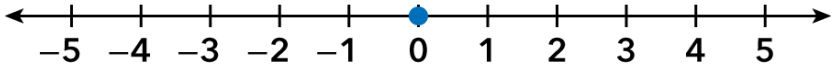
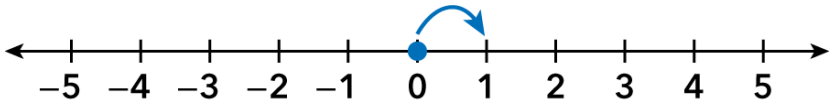
Algebra Strings (1 of 2)

Look for patterns.

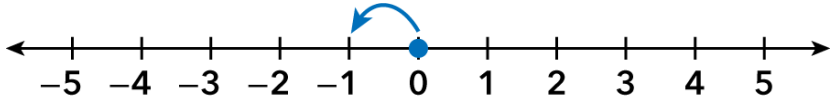
$0 + 0 = ?$



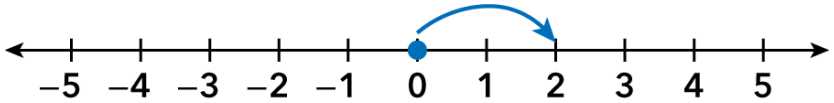
$0 + 1 = \square$



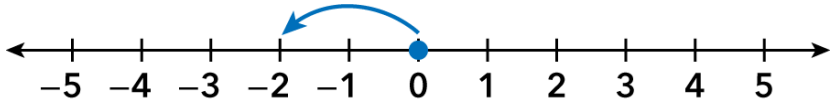
$0 + \square = -1$



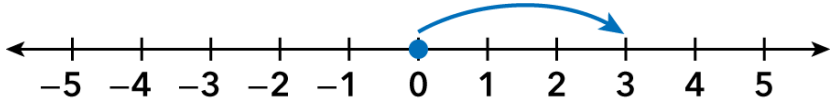
$0 + \square = 2$



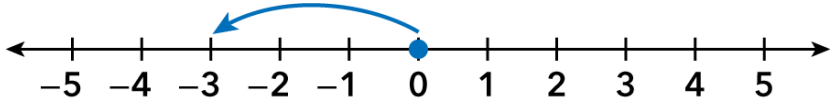
$0 + \square = -2$



$0 + \square = 3$



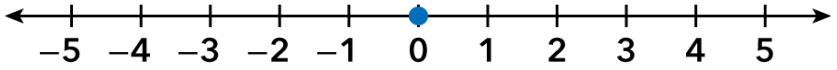
$0 + \square = -3$



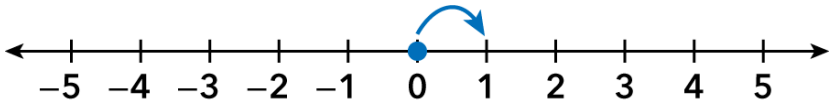
Algebra Strings (2 of 2)

Look for patterns.

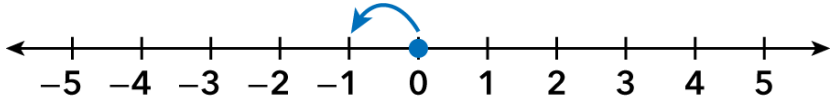
$0 + 0 = ?$



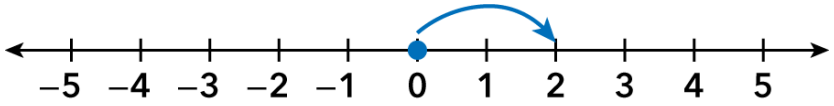
$0 + 1 = \square$



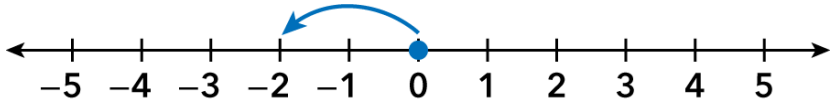
$0 + \square = -1$



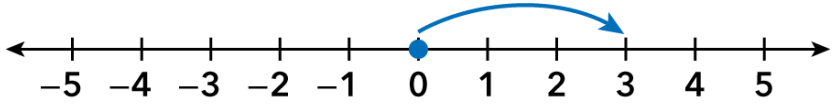
$0 + \square = 2$



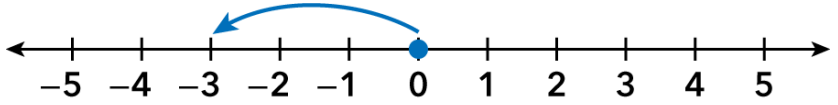
$0 + \square = -2$



$0 + \square = 3$



$0 + \square = -3$



$0 + \square = 4$

$0 + \square = -4$

Algebra Strings (2 of 2)

Look for patterns. Teacher Notes.

Explain that students should look at the rows of number lines and equations carefully to see what patterns they notice. This is also students' first exposure to adding integers. By using 0 as the starting point, the addition is unobtrusive, reinforcing the concept of plotting points and opposite integers and relating them to the concept of addition without looking for a rule.

As students look for patterns, ask:

- What do you notice about the number lines?
- How does the distance modeled on the number lines change from row to row? How about across each row?
- How do the equations change from row to row? How about across each row?
- How can you use the patterns in the previous rows to draw number lines for the last row?
- What numbers complete the equations in the bottom row?

Strategize First Steps

Decide on a first step.

$$-0.75 \times \frac{2}{9} \times \frac{1}{2}$$

Strategize First Steps

Decide on a first step. Teacher Notes.

Use this Math Talk to support students as they apply what they know about multiplying and dividing integers to make sense of multiplying positive and negative decimals and fractions. Anticipate and facilitate a discussion along these lines:

I would write the fraction multiplication together: -0.75 x (2 x 1)/(9 x 2).

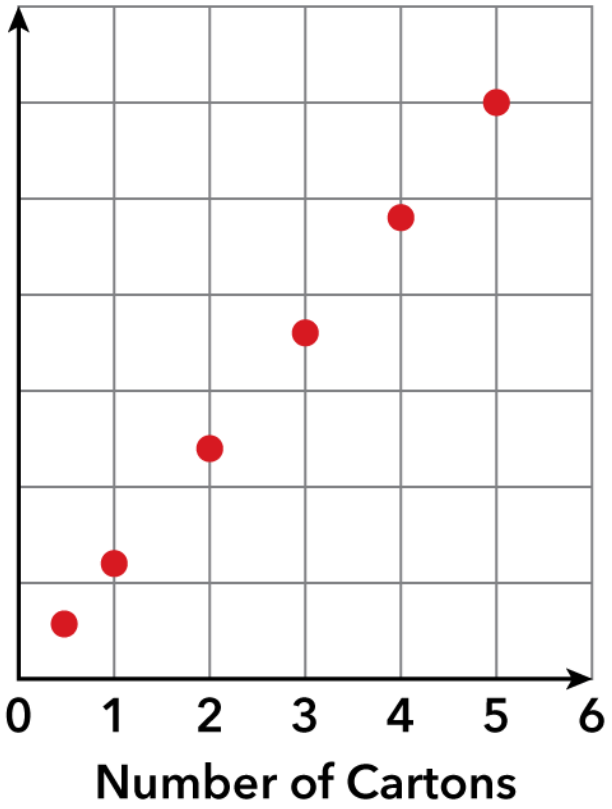
Say: Good idea! Apply a rule for fraction multiplication.
I would remove the common factor of 2 in the fractions, which makes one fraction: -0.75 x 1/9

Say: Nice idea! Apply another rule for fraction multiplication.
I would write −0.75 as the fraction -3/4: -3/4 x 2/9 x 1/2

Say: Another idea! Writing the only decimal as a fraction gives you three fractions to multiply.

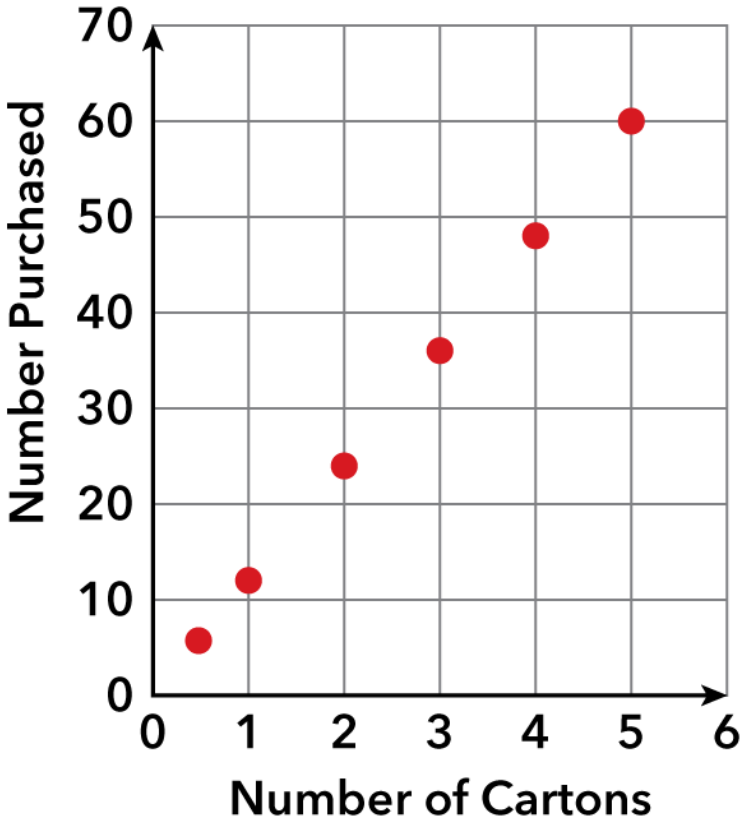
Slow Reveal Graph (1 of 3)

What do you think this graph is about?



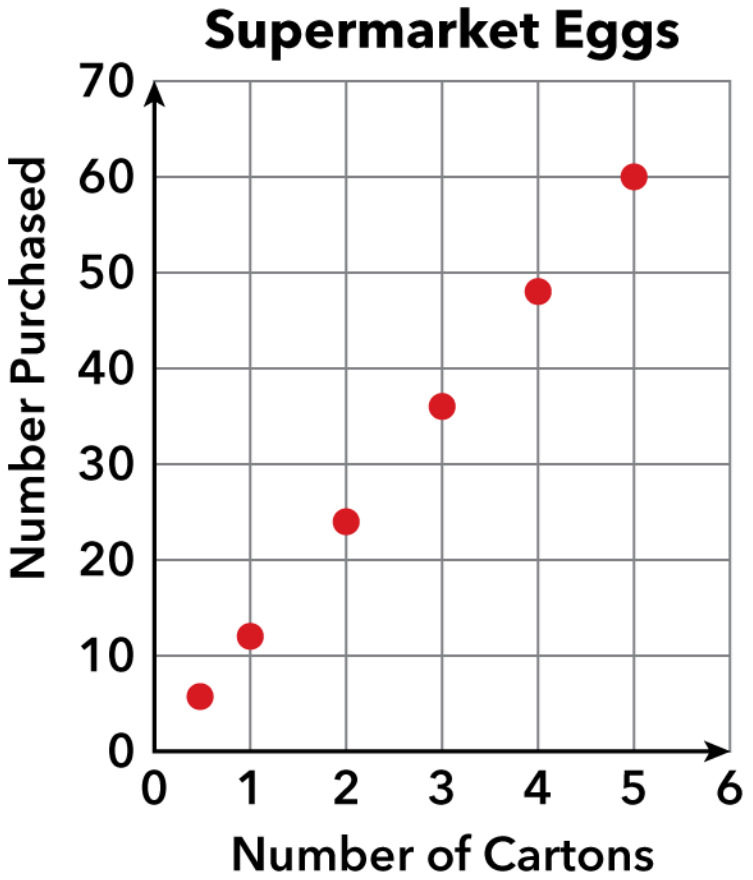
Slow Reveal Graph (2 of 3)

What do you think this graph is about?



Slow Reveal Graph (3 of 3)

What do you think this graph is about?



Slow Reveal Graph (3 of 3)

What do you think this graph is about? Teacher Notes.

This Slow Reveal Graph allows students to interpret proportional relationships and interpret ordered pairs. Use this Math Talk to review graphing in the coordinate plane and encourage students' analysis of coordinate graphs. As new information is revealed about the graph, ask:

- What do you notice about the points on the graph? What sort of relationship do you see?
- How many cartons are represented by the point at the top right?
- How many cartons are represented by the point at the bottom left? Does that make sense? Why or why not?
- How many items are in each carton? How do you know?

Some students may not be familiar with the concept of a half-carton of eggs. After showing the final slide, explain that some egg cartons are perforated down the middle so people can separate them in half and buy only 6 eggs.

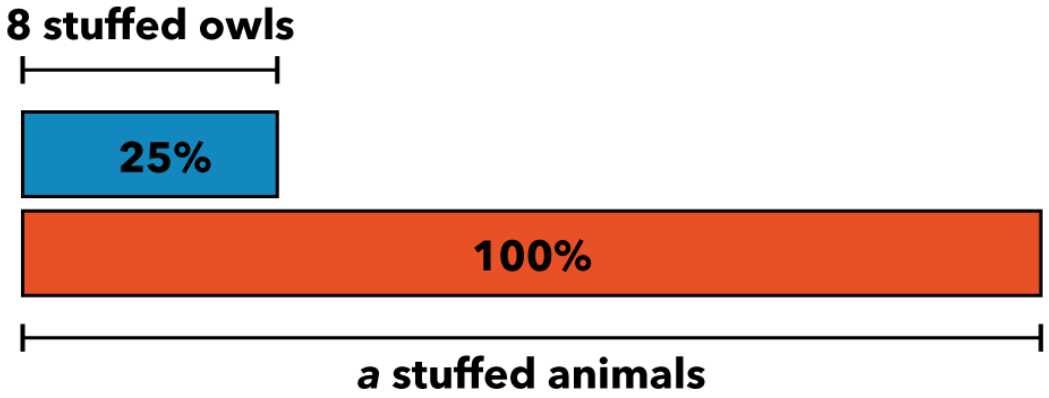
Which One Doesn't Belong?

Choose one. Tell how it is different.

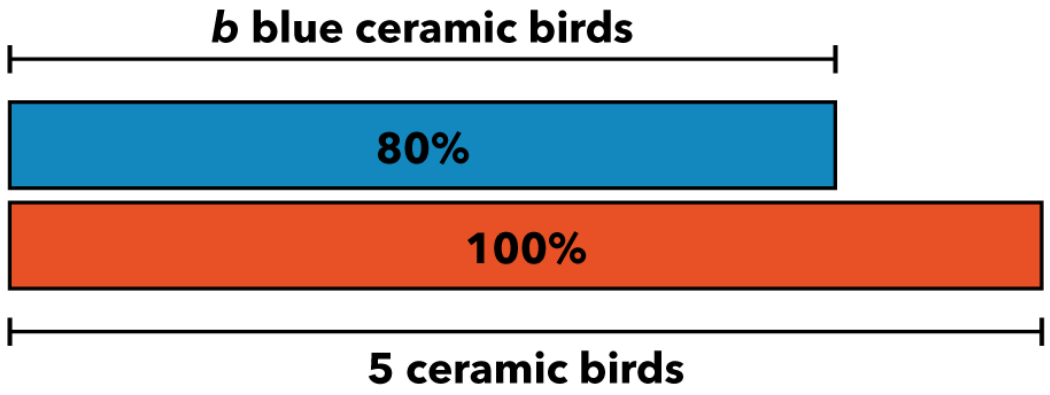
A

$$\frac{4}{5} = \frac{c}{100}$$

B



C



D

$$\frac{8}{x} = \frac{y}{100}$$

Choose one. Tell how it is different. Teacher Notes.

Comparing proportions and bar diagrams prepares students for solving for unknowns in percent problems in this lesson. Use this Math Talk to support students' strategies for solving for an unknown percent, part, and whole in a proportion.

Encourage students to look at each representation to see how it differs from the others. As students discuss the representations, focus on the concept of percent. Ask:

- How could you write proportions for the bar diagrams? How could you show the proportions as bar diagrams?
- What is the same in all the representations? How is each unique?

Students may notice that A has an unknown percent, B shows a different percent relationship than the others, C has an unknown part, and D has two unknowns. Anticipate that your students will offer a variety of rationales for how the representations differs from each other.

Same But Different

Compare the information in each box.

Fruits
Daily intake: f grams Recommendation: increase by 12% $f + 0.12f$ grams

Grains
Daily intake: g grams Recommendation: increase by 12% $1.12g$ grams

Same But Different

Compare the information in each box. Teacher Notes.

Use this Math Talk to support students' work writing and making sense of equivalent expressions. As students discuss the percent change situations, ask:

- How does the first expression represent the image? What is an equivalent expression? How do you know?
- What is an expression that represents the second image? What is an equivalent expression? How do you know?

Discuss how the quantities in different forms of the expressions connect to the images. Pay attention to any connections students make between increasing by 12% and multiplying by 1.12, and decreasing by 12% and multiplying by 0.88.

Expect students to notice various differences beyond that one amount of intake is increasing and one is decreasing.

Equation Detective

Analyze this solution. Look for any mistakes.

Evaluate $p - \frac{6}{7}p$ for $p = 20$.

$$20 - \frac{6}{7}(20)$$

$$= 20\left(1 - \frac{6}{7}\right)$$

$$= 20\left(\frac{1}{7}\right) = \frac{20}{7}$$

$$= 2\frac{6}{7}$$

Equation Detective

Analyze this solution. Look for any mistakes.

Teacher Notes.

Have students evaluate the expression 20 – (6/7)p for p=20. Then use the Math Talk to discuss another strategy. The work shown in the Math Talk applies the Distributive Property instead. Anticipate that some students will think there must be an error, even though there is not. As students analyze the work, ask:

- What steps did this student take to evaluate the expression for the given value?
- Did the student perform the order of operations correctly?
- Are the student's calculations correct? How do you know?
- How does this method compare to the method you used?