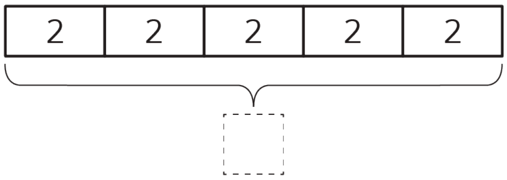
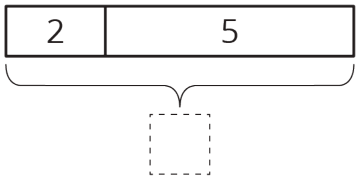
Lesson 1: Tape Diagrams and Equations

Let's see how tape diagrams and equations can show relationships between amounts.

1.1: Which Diagram is Which?

1. Here are two diagrams. One represents $2 + 5 = 7$. The other represents $5 \cdot 2 = 10$. Which is which? Label the length of each diagram.





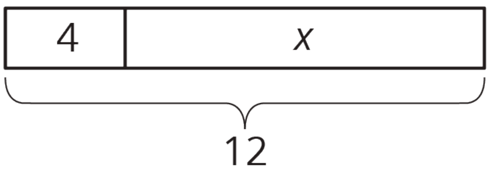
2. Draw a diagram that represents each equation.

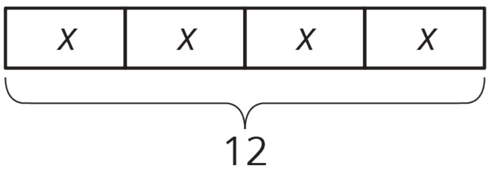
$4 + 3 = 7$

$4 \cdot 3 = 12$

1.2: Match Equations and Tape Diagrams

Here are two tape diagrams. Match each equation to one of the tape diagrams.





- $4 + x = 12$
- $12 \div 4 = x$
- $4 \cdot x = 12$
- $12 = 4 + x$
- $12 - x = 4$
- $12 = 4 \cdot x$
- $12 - 4 = x$
- $x = 12 - 4$
- $x + x + x + x = 12$

1.3: Draw Diagrams for Equations

For each equation, draw a diagram and find the value of the unknown that makes the equation true.

1. $18 = 3 + x$

2. $18 = 3 \cdot y$

Are you ready for more?

You are walking down a road, seeking treasure. The road branches off into three paths. A guard stands in each path. You know that only one of the guards is telling the truth, and the other two are lying. Here is what they say:

- Guard 1: The treasure lies down this path.
- Guard 2: No treasure lies down this path; seek elsewhere.
- Guard 3: The first guard is lying.

Which path leads to the treasure?

Lesson 1 Summary

Tape diagrams can help us understand relationships between quantities and how operations describe those relationships.

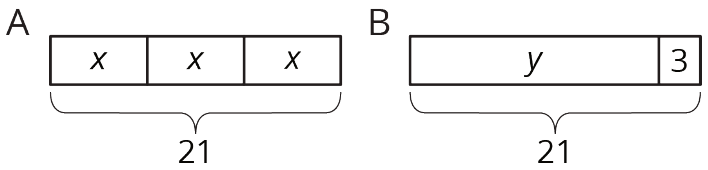


Diagram A has 3 parts that add to 21. Each part is labeled with the same letter, so we know the three parts are equal. Here are some equations that all represent diagram A:

$$x + x + x = 21$$

$$3 \cdot x = 21$$

$$x = 21 \div 3$$

$$x = \frac{1}{3} \cdot 21$$

Notice that the number 3 is not seen in the diagram; the 3 comes from counting 3 boxes representing 3 equal parts in 21.

We can use the diagram or any of the equations to reason that the value of x is 7.

Diagram B has 2 parts that add to 21. Here are some equations that all represent diagram B:

$$y + 3 = 21$$

$$y = 21 - 3$$

$$3 = 21 - y$$

We can use the diagram or any of the equations to reason that the value of y is 18.