## 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 $5⋅2=10$. Which is which? Label the length of each diagram.
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1. Draw a diagram that represents each equation.
* $4+3=7$
* $4⋅3=12$

### 1.2: Match Equations and Tape Diagrams

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



* $4+x=12$
* $12÷4=x$
* $4⋅x=12$
* $12=4+x$
* $12−x=4$
* $12=4⋅x$
* $12−4=x$
* $x=12−4$
* $x+x+x+x=12$

### 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. $18=3⋅y$

#### 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:

$x+x+x=21$

$3⋅x=21$

$x=21÷3$

$x=\frac{1}{3}⋅21$

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.



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