

Grade 8 Mathematics

Algebra: Lesson 4

Read aloud to the students the material that is printed in **boldface type** inside the boxes. Information in regular type inside the boxes, and all information outside the boxes, should **not** be read to students. Possible student responses are included in parentheses after the questions.

NOTE: The directions read to students may depend on the available materials. Read only those parts of the lesson that apply to the materials you are using.

Any directions that ask you to do something, such as to turn to a page or to hand out materials to students, will have an arrow symbol (\downarrow) by them.

Purpose of Lesson 4:

- In this lesson, the tutor and the students will
 - ✓ using proportional reasoning, find the missing amount that balances a scale; and
 - ✓ use substitution to find the missing objects on a scale.

Equipment/Materials Needed:

- Copies of Student Sheet 71 and 72
- Paper and pencils

Preparations before beginning Lesson 4:

- Run one copy of Student Sheets 71 and 72 for each student.
- Have paper and pencils available.

Lesson 4: Algebra

Say:

In Lesson 2 of Number, you used a balance scale to help you solve an equation. In this lesson, you will again use a balance scale. This time, you will find what objects would be needed to balance the scale. Remember that in order for a scale to be balanced, the objects on both sides must equal the same amount. If you were using a real scale, the weight of the objects on one side would have to equal the weight of the objects on the other side.

└ Give students Student Sheet 71.

Say:

Let's look at Number 1. The scale on the left is balanced. What does that tell you? (One square balances three circles or one square is the same as three circles.) **In the second scale, the left side has two squares. How many circles would need to be in the pan on the left to balance the scale?** (6) **How did you decide this?** (If one square balances 3 circles, then 2 squares would balance 6 circles.) Have the students complete the sheet. It is important to discuss each problem to hear how students reasoned.

Answers:

1. 6 circles
2. 8 triangles
3. 2 circles
4. 1 star
5. 2 diamonds

Say:

Sometimes, more than two types objects are involved. We can still use the idea of balance scales to find the missing objects. This involves the concept of substitution. We substitute an object of equal value for another object.

└ Give students Student Sheet 72.

Say:

Let's look at Number 1. The first two scales of each problem are balanced. What does that tell you? (One square is the same as two triangles and one triangle is the same as four circles.) How many circles would balance the third scale? (8) How did you decide? (One square is equal to 2 triangles. Each triangle equals 4 circles. I could substitute 4 circles for each triangle, so I would have $4 + 4$ or 2×4 which is 8 circles.) It is important to discuss each problem to hear how the students reasoned.

Answers:

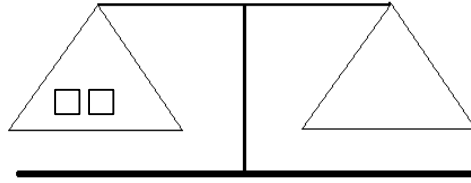
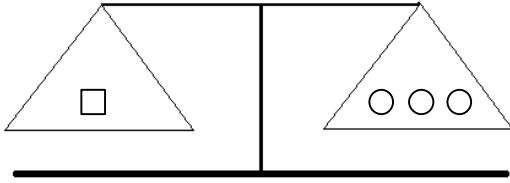
1. 8 circles
2. 6 squares
3. 2 squares
4. 3 triangles
5. 4 ovals

] Have one student summarize today's lesson. Understanding the idea that two sides of an equation must be balanced if they name the same amount is important in learning to solve equations.

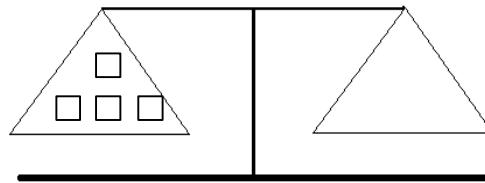
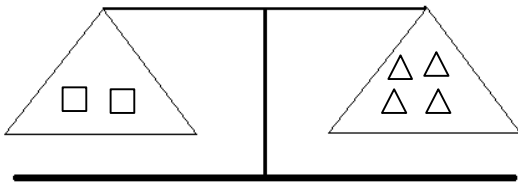
Student Sheet 71 (Algebra: Lesson 4)

The scales on the left are balanced. What would balance the scales on the right?

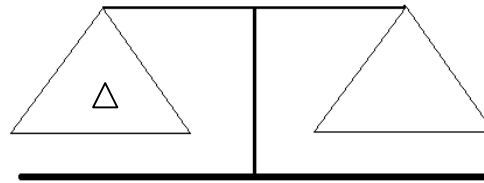
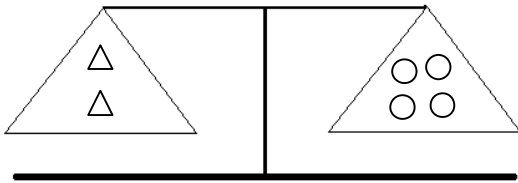
1.



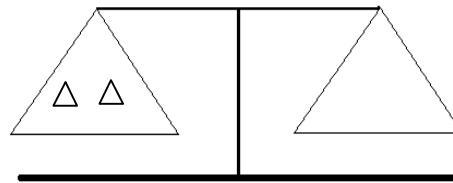
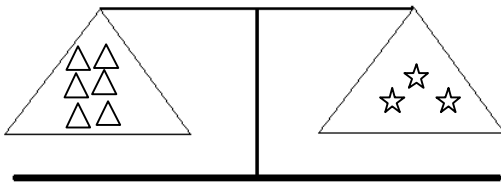
2.



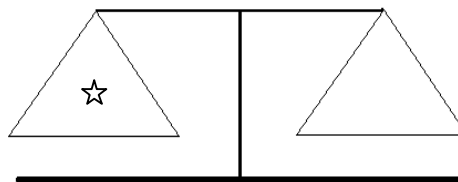
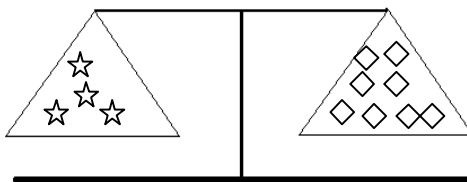
3.



4.

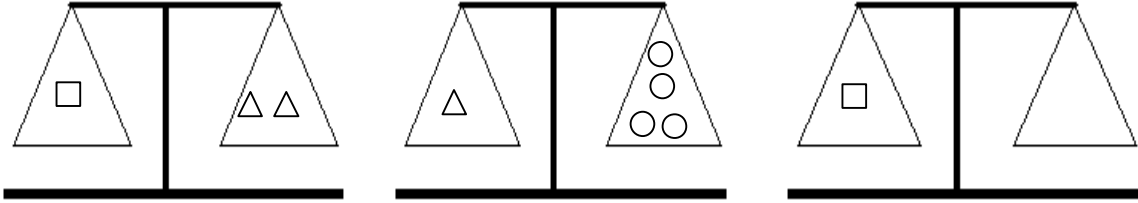


5.

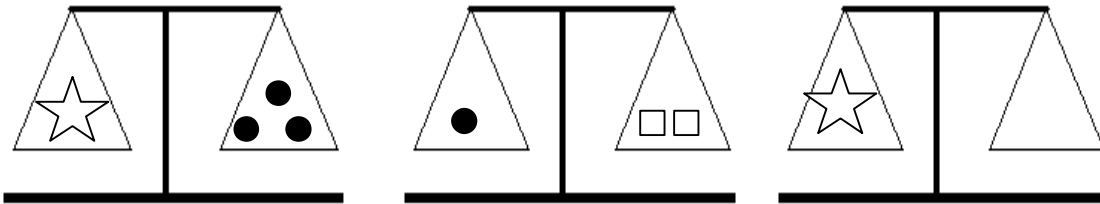


Student Sheet 72 (Algebra: Lesson 4)

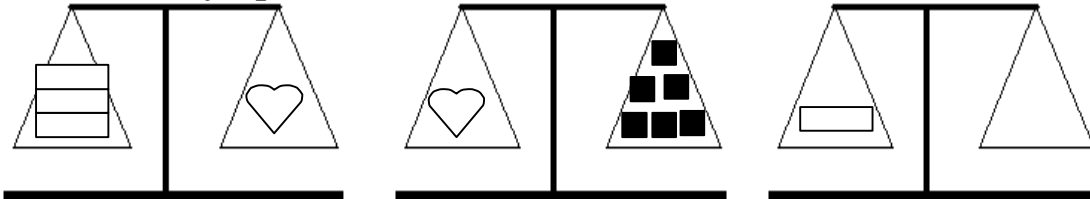
1. The first two scales are balanced. How many circles will balance the 3rd scale?



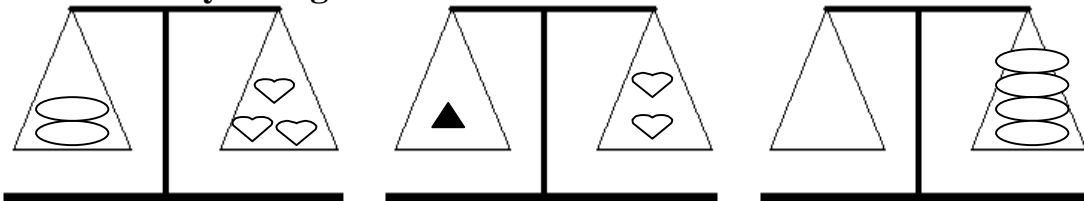
2. The first two scales are balanced. How many squares will balance the 3rd scale?



3. How many squares will balance the 3rd scale?



4. How many triangles will balance the 3rd scale?



5. How many ovals will balance the 3rd scale?

