Unit 4, Lesson 5

Keeping the Equation Balanced

Let's figure out unknown weights on balanced hangers.

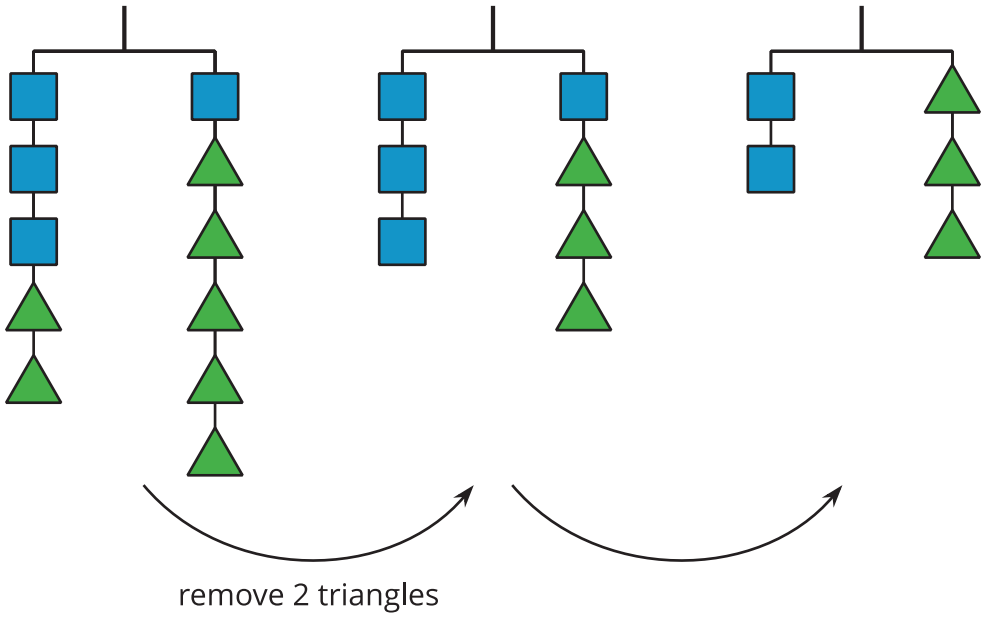
5.1 Let Me Count the Ways

Write as many equivalent expressions for each as you have time.

1. 10

2. $2x$

5.2 Hanging Blocks



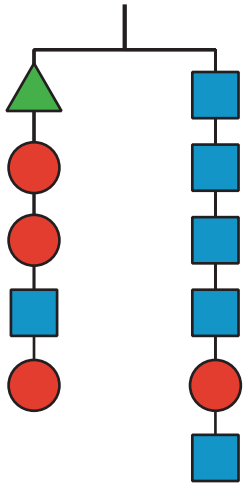
1. What changes from the second hanger to the third? Write your answer under the arrow.
2. If a triangle weighs 1 gram, how much does a square weigh? Explain or show your reasoning.

CC BY NC Illustrative Mathematics, based on IM 6–8 Math, CC BY Open Up Resources.

5.3 More Hanging Blocks

A triangle weighs 3 grams, and a circle weighs 6 grams.

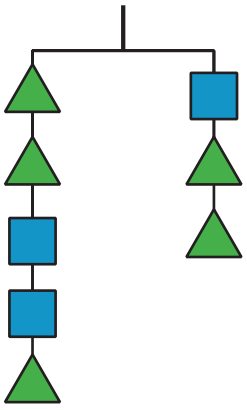
1. Write an equation to represent the hanger.



2. Find the weight of a square in the hanger. Show or explain your reasoning.

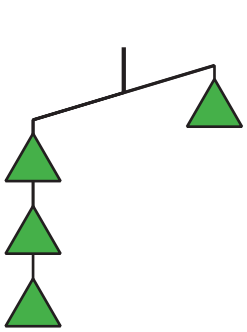
Are you ready for more?

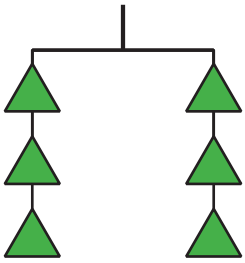
What is the weight of a square on this hanger if a triangle weighs 3 grams?

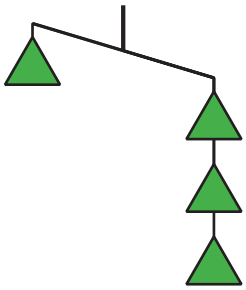


Lesson 5 Summary

If we have equal weights on the ends of a hanger, then the hanger will be in balance. If there is more weight on one side than on the other, the hanger will tilt to the heavier side.

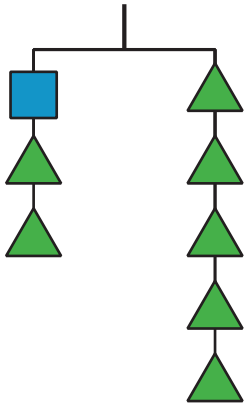


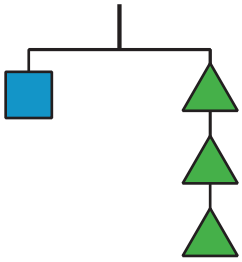




We can think of a balanced hanger as a representation for an equation. An equation says that the expressions on each side have equal value, just like a balanced hanger has equal weights on each side. This hanger could be represented by $a + 2b = 5b$.

If we have a balanced hanger and add or remove the same amount of weight from each side, the result will still be in balance. Here, we remove 2 triangles from each side, which is like subtracting $2b$ from each side of the equation to get $a = 3b$.





In the same way that adding or subtracting the same shapes on each side of a hanger keeps it in balance, adding or subtracting the same value to each side of an equation creates an equivalent equation.