Lesson: Symbols & Values of an Unknown
Third Grade Objective 5.03 & 5.04:
Use symbols to represent unknown quantities in number sentences.
Find the value of an unknown in a number sentence.

Lesson
The equals sign is a very important part of a number sentence. Think of a balance scale. Each side of the scale needs to have the same weight in order for the scale to balance and not have one side higher than the other. The equals sign in a number sentence is like the center of a scale. Each side of the number sentence needs to have the same weight (or the same total amount) for the equals sign to be true.

In this number sentence, the left and right side of the equals sign both have a weight (or value) of ten.
2 + 8 = 10

In this number sentence, the left and right side of the equals sign both have a weight (or value) of 20.
4 x 5 = 20

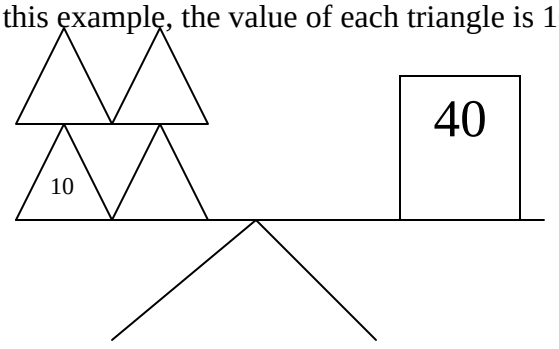
It does not matter which side of the equals sign has the "answer" and which has the "problem" as long as both sides of the number sentence have the same weight (or value). So 3 + 4 = 7 means the exact same thing as 7 = 3 + 4

On the NCTM website http://illuminations.nctm.org/ActivityDetail.aspx?id=26 you can practice putting numerical expressions (like 3 + 4) on one side of a scale and then the answer (like 7) on the other side to see if the scale will balance.

Number sentences can have an unknown value like 4 + @ = 6. In this number sentence, the @ represents the number 2 because 4 + 2 = 6.

Unknown values can be represented by letters and symbols called variables.
Here are a few examples (in each example * represents 7)
8 + * = 15
* + 3 = 10
9 – 2 = *

In this example, the value of each triangle is 10.

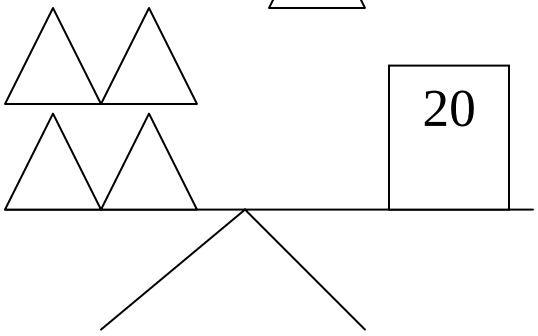


Try these on your own!

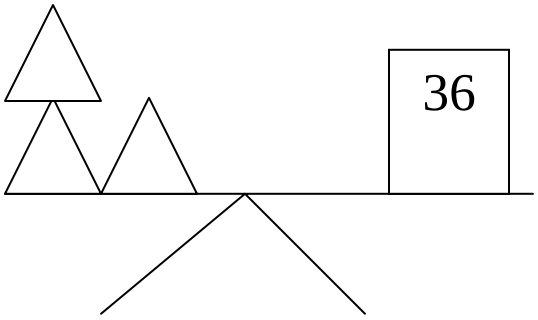
What does the ☺ represent in each number sentence?

1. 7 + ☺ = 15 ☺ = _____
2. 19 - ☺ = 6 ☺ = _____
3. ☺ x 3 = 12 ☺ = _____
4. 4 x 2 + 1 = ☺ ☺ = _____
5. 10 – 2 + 3 = 5 + ☺ ☺ = _____

What is the value of the △ on each scale?



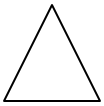
△ = _____

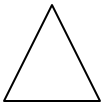


△ = _____

Check your answers

1. 8 (7 + 8 = 15)
2. 13 (19-13 = 6)
3. 4 (4 x 3 = 12)
4. 9 (4 x 2 + 1 = 9)
5. 6 (10 – 2 + 3 = 5 + 6)

 = 5 (5 x 4 = 20)

 = 12 (12 x 3 = 36)