Transitive Property

The **Transitive Property** is another logic property of Algebra, which simply tells us that,

if $a = b$ and $b = c$, then $a = c$

Of course, this makes sense if we think about it in terms of real numbers. All we're saying here with the Transitive Property is that, if we know that $5 = 4 + 1$, and we also know that $4 + 1 = 2 + 3$, then we can conclude that $5 = 2 + 3$.

$$\begin{aligned} 5 = {} & \boxed{4+1} \\ & \boxed{4+1} = 2+3 \end{aligned}$$

"Transitive" comes from the word "transit" which means to move from one place to another. In this case we can "jump" over the middle and link the ends together, since the ends are both equal to the middle.

Let's do an example where we apply the Transitive Property.

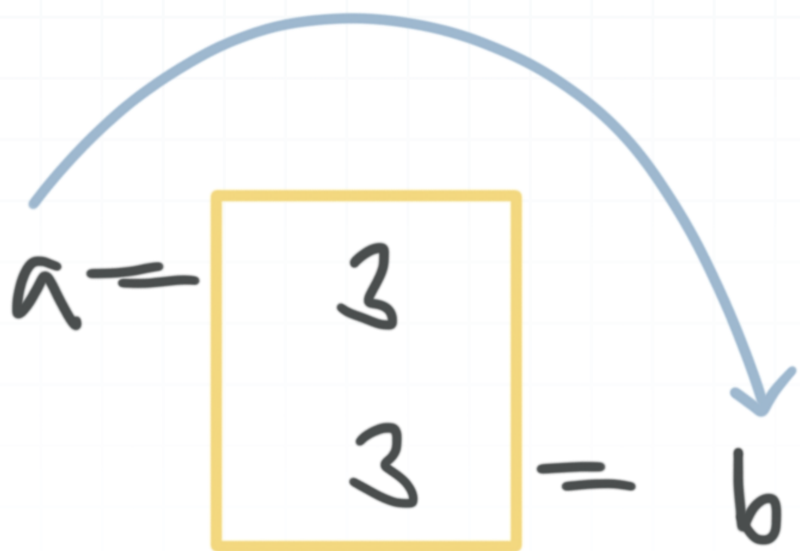
Example

For numbers a and b, what can we say about the relationship between a and b if both of the following statements are true?

$$a = 3$$

$$b = 3$$

We can take the equation $b = 3$ and "turn it around" (switch the left-hand side with the right-hand side), which gives $3 = b$. Now we have the following:



Since $a = 3$ and $3 = b$, the transitive property tells us that $a = b$.

Let's try another example of the Transitive Property.

Example

Consider the variables x, y, and z. Use the Transitive Property to write an equation that relates the variable x to the variable z, with no mention of the variable y.

$$x = y$$

$$y = 2z + 4$$

These expressions seem more complicated, but it doesn't matter what the expressions are. If we know that $x = y$ and that $y = 2z + 4$, then Transitive Property tells us that $x = 2z + 4$.

$$x = y$$
$$y = 2z + 4$$