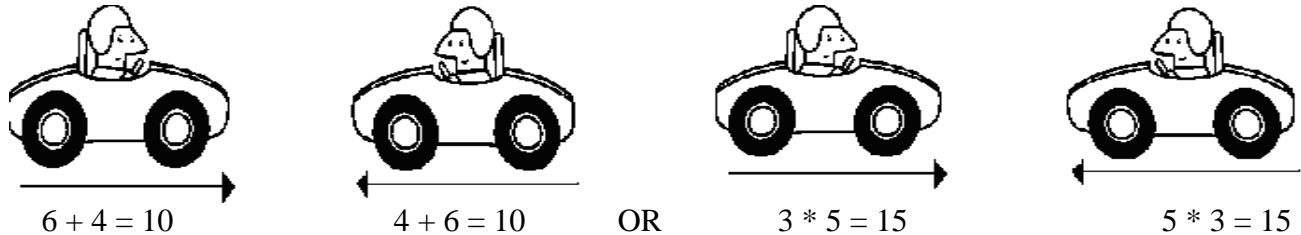


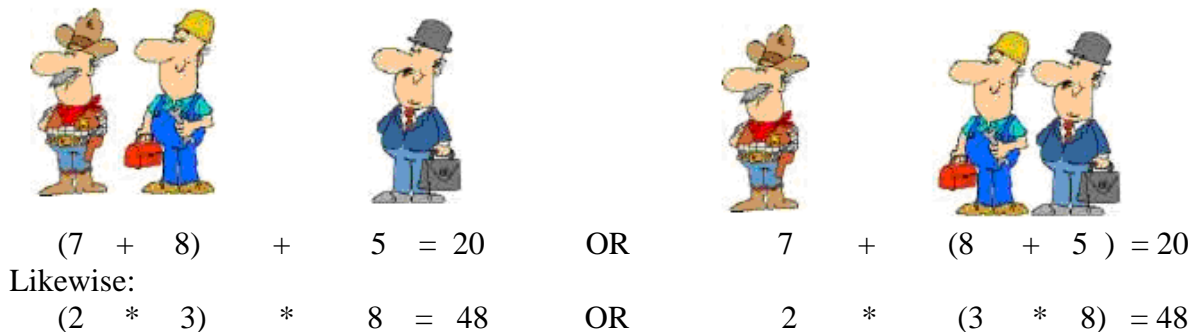
# Number Properties

**\*\*These first two properties only apply to expressions only involving addition or only involving multiplication\*\***

**Commutative Property** – says that in addition or in multiplication, the order of any two items can be reversed. Remember by thinking of these items as “commuting,” going back and forth.



**Associative Property** – says that in addition or multiplication, any pair of items can be grouped together. Remember by thinking of “associating” or “hanging out together.” Any two of a group of friends can “hang out” first, and then others can join in.



**Distributive Property** – says that multiplication can be “distributed” or shared with grouped expressions. It is also used sometimes to describe factoring out a common term.



$$3a(5 + b + c) = 15 + 3ab + 3bc$$

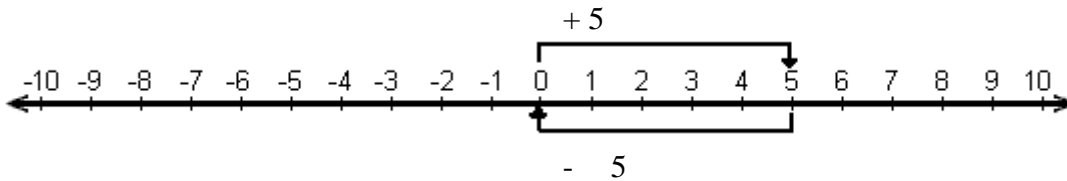
“distributing”



$$15a + 3ab + 3ac = 3a(5 + b + c)$$

“factoring”

**Inverse Property** - says that you can change a number to 0 by adding an equal number of the opposite sign. Likewise, you can use this in multiplication/division; change a number to 1 by doing the opposite operation with the same number and same sign. Remember: inverse helps you “reverse.” We use this property constantly in solving equations for a specific variable.

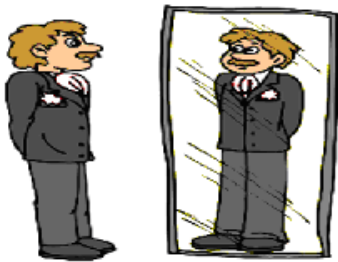


$$a + 5 = 8 \rightarrow \boxed{a + 5 - 5 = 8 - 5} \rightarrow \boxed{a + 0 = 3} \quad a = 3$$

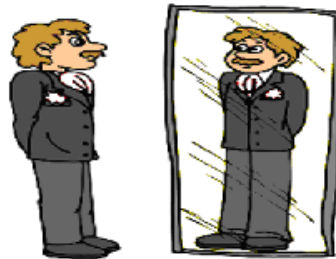
Likewise:

$$6a = 42 \rightarrow \boxed{\frac{6a}{6} = \frac{42}{6}} \rightarrow \boxed{1a = 7} \quad a = 7$$

Identity – As we say constantly while solving problems: anything plus 0 remains itself, and anything times 1 remains itself. This is also the “imaginary” 1 in front of many variables. Remember: the item doesn’t change - it remains itself – it retains its identity. This occurred in the second box above.



$$a + 0 = a$$



$$1a = a$$