

# Transitive property

The transitive property is another term in math that is really just logic. It makes sense that if  $a = b$  and  $b = 4$ , then  $a$  must also equal 4.

Transitive Property:

$$\text{If } a = b \text{ and } b = c, \text{ then } a = c$$

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 both equal the middle.

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## Example

Use the transitive property to solve for  $z$ .

$$x = 3z - 1$$

$$x = y$$

$$y = 2z + 4$$

Since  $x = y$  and  $y = 2z + 4$ , by the transitive property we can say that  $x = 2z + 4$ . We have also been told that  $x = 3z - 1$ , so  $3z - 1 = 2z + 4$

$$3z - 1 = 2z + 4$$

Subtract  $2z$  from both sides.



$$3z - 2z - 1 = 2z - 2z + 4$$

$$z - 1 = 4$$

Add 1 to both sides.

$$z - 1 + 1 = 4 + 1$$

$$z = 5$$

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Let's try another example of the transitive property.

### Example

Use the transitive property to solve for  $z$ .

$$x = 5z + 3$$

$$x = y$$

$$y = z - 7$$

Since  $x = y$  and  $y = z - 7$ , by the transitive property we can say that  $x = z - 7$ . We have also been told that  $x = 5z + 3$ , so  $5z + 3 = z - 7$ .

$$5z + 3 = z - 7$$

Subtract  $z$  from both sides.

$$5z - z + 3 = z - z - 7$$



$$4z + 3 = -7$$

Subtract 3 from both sides.

$$4z + 3 - 3 = -7 - 3$$

Divide both sides by 4.

$$\frac{4z}{4} = -\frac{10}{4}$$

$$z = -\frac{10}{4}$$

$$z = -\frac{5}{2}$$

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