

9/3/15



How do I solve an equation in one variable?

~~How do I solve an equation in one variable?~~

How do I justify the solution to an equation?

Today's CCGPS Standards

MCC9-12.A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

Algebraic Proofs Reasons

	<u>Name of Property</u>	<u>Statement of Property</u>	<u>In my own words</u>
Most Helpful	Addition Property of Equality	If $a = b$, then $a + c = b + c$	I can <u>add</u> the same thing to both sides of an equation without changing the solutions.
	Subtraction Property of Equality	If $a = b$, then $a - c = b - c$	I can <u>subtract</u> the same thing from both sides of an equation without changing the solutions.
	Multiplication Property of Equality	If $a = b$, then $ac = bc$	I can <u>multiply</u> both sides of an equation by the same number (other than 0) without changing the solutions.
	Division Property of Equality	If $a = b$ and $c \neq 0$, then $a / c = b / c$	I can <u>divide</u> both sides of an equation by the same number (other than 0) without changing the solutions.
	Distributive Property of Equality	For any real numbers a , b , and c : $a(b + c) = ab + ac$	I can <u>distribute</u> a number outside parentheses to each term inside parentheses without changing the meaning of the expression.

Algebraic Proofs Reasons

Simplify (Combine Like Terms)	For any real numbers a , b , and x : $ax + bx = (a + b)x$	I can <u>combine like terms</u> without changing the meaning of the expression.
Symmetric Property of Equality	If $a = b$, then $b = a$	I can <u>swap the sides</u> of an equation without changing the solutions.
Reflexive Property of Equality	For any real number a : $a = a$	Any number is equal to itself.
Substitution Property of Equality	If $a = b$, then a can be substituted for b in any expression or equation	If I know the value of a variable, I can substitute that into other expressions and equations.

Algebraic Proofs Reasons

1. Solve $48 = 5(2x - 7) + 3$.
Justify each step. You may not use all the rows in the proof.

Statement	Reason

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Justify each step. You may not use all the rows in the proof.

Answers may vary.

Statement	Reason
$48 = 5(2x - 7) + 3$	Given
$48 = 10x - 35 + 3$	Distributive P.o.E.
$45 = 10x - 35$	Subtraction P.o.E.
$80 = 10x$	Addition P.o.E.
$8 = x$	Division P.o.E.
$x = 8$	Symmetric P.o.E.

Algebraic Proofs Reasons

2. Solve $3x + 4 = 12(x + 2) - 5x$.
Justify each step. You may not
use all the rows in the proof.

Statement	Reason

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Justify each step. You may not
use all the rows in the proof.

Answers may vary.

Statement	Reason
$3x + 4 = 12(x + 2) - 5x$	Given
$3x + 4 = 12x + 24 - 5x$	Distributive P.o.E.
$3x + 4 = 7x + 24$	Combine Like Terms
$-4x + 4 = 24$	Subtraction P.o.E.
$-4x = 20$	Subtraction P.o.E.
$x = -5$	Division P.o.E.

Algebraic Proofs

Reasons

3. Solve $\frac{x}{8} + \frac{5}{6} = 2$.

Justify each step. You may not use all the rows in the proof.

Statement	Reason

3. Solve $\frac{x}{8} + \frac{5}{6} = 2$.

Justify each step. You may not use all the rows in the proof.

Answers may vary.

Statement	Reason
$\frac{x}{8} + \frac{5}{6} = 2$	Given
$3x + 20 = 48$	Multiplication P.o.E.
$3x = 28$	Subtraction P.o.E.
$x = 28/3$	Division P.o.E.

Algebraic Proofs Reasons

4. Each of the following equations has the same solutions as $3(x + 4) = 7$. Explain why by giving the name of one of the reasons we have discussed.

$$3x + 12 = 7$$

$$6(x + 4) = 14$$

$$3(x + 4) - 5 = 2$$

$$7 = 3(x + 4)$$

4. Each of the following equations has the same solutions as $3(x + 4) = 7$. Explain why by giving the name of one of the reasons we have discussed.

$$3x + 12 = 7 \quad \text{Distributive P.o.E.} \quad [\text{distributed 3 to } x \text{ and } 4]$$

$$6(x + 4) = 14 \quad \text{Multiplication P.o.E.} \quad [\text{multiplied both sides by 2}]$$

$$3(x + 4) - 5 = 2 \quad \text{Subtraction P.o.E.} \quad [\text{subtracted 5 from both sides}]$$

$$7 = 3(x + 4) \quad \text{Symmetric P.o.E.} \quad [\text{swapped left and right sides}]$$

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