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What I Learnt about Grade 9 solving equations

What is an Equation?
Equation is a statement that means two things are equal.
For example 15=10+5, which is a true statement. Because the number on the left side is equal (same) as the numbers on the right. Equation is also something that has this sign =.

What are equivalent equations?
Equivalent Equation is adding or subtracting expressions or numbers on both sides. By adding or subtracting, that creates a new Equivalent Equation. So Equivalent Equations are equations that have the same solutions. Example

How to solve equations

Adding and subtracting numbers/ variables on both sides. You have to use legal moves (doing the same thing on both sides) to solve equations. At the end divide the variable and the number on both sides, by how many variable there are.

Example 2x=10 → 2x/2 = 10/2 → x=5

- **Visually with algebra tiles**

How to solve equations with algebra tiles

ex: $(-8x)-2 = (-3x)+7$

$X(s) \rightarrow$

cancel out

add zero pair $+2$

add $+3x$

zero pair

what's left

$-5x = 9$

$$\frac{-5x}{5} = \frac{9}{5}$$

$x = -1.8$

- **Algebraically**

How to solve equations Algebraically.

ex: $-4x + 14 = 24 - 6x$

zero pair $-14 \quad -14$ → do the same on both sides

$-4x = 10 - 6x$

$+6x \quad +6x$

Divide by $\frac{2x}{2} = \frac{10}{2}$ → $x = 5$

answer

- **BFSD (Bracket, Fraction, Sort, Divide)**
  When solving an equation that has BFSD, you have to solve things in that order. So from 1. Brackets 2.Fraction 3.Sort 4.Divide

How to solve equations BFSD

ex: $4(5n-7) = 10n+2$

Do Brackets first

$20n - 28 = 10n+2$
$+28 +28$

Sort

$20n = 10n + 30$
$-10n -10n$

$10n = 30$

Divide

$\dfrac{10n}{10} = \dfrac{30}{10}$

$n = 3$ ← Answer

How to verify a solution is correct

After you figure out what the variable equals to, you have to add the number that the variable equals to, to the places where the variable was. At the end if the number on both sides of the equation is the same, the answer is correct. But if the numbers are different than it is wrong. For Example.

How to check

ex: $6x + 2 + x = 3x + 10 + 2x$

$7x + 2 = 5x + 10$
$-5x -5x$

$2x + 2 = 10$
$-2 -2$

$\dfrac{2x}{2} = \dfrac{8}{2}$

$x = 4$

check →

add 4 to the x (variable) spot

↓

$6(4) + 2 + 4 = 3(4) + 10 + 2(4)$

$24 + 2 + 4 = 12 + 10 + 8$

$30 = 30$ ✓

↑ if both side are the same number then the answer is correct

Vocabulary

- **Equation –** two mathematical expressions are identical/same.
- **Equivalent-** equivalent means that they are equal/same/ identical in meaning, value, function.
- **Solution-** A number/value(s) that you put in to replace a variable (x) that could make the equation true.
- **Coefficient-** A number in front of a variable. Example, 5x (the 5 is the coefficient.)
- **Zero pairs-** pair of number(s) whose amount equals to zero. Example, +5-5= 0
- **Variable-** Symbol for a number we don't know yet. Example x or y.
- **Constant-** A number on its own, with no exponent or variable.
- **Common denominator-** Is a number that can be divided exactly by all the denominators in the group of fractions. Example, 2/5 and 1/3 the common denominator would be 15.
- **Distribute-** Spreading things out equally/ dividing it into parts.