

Topic: SOLVING EQUATIONS

Introduction:

An equation is a statement that helps us understand the equality between two or more variables, and constants. The word 'equation' is derived from the word 'equal'. The equals sign shows that both sides are exactly the same value.

Solving Equations (videos):

<https://www.youtube.com/watch?v=W7fPsSw74TM>

<https://www.youtube.com/watch?v=58mHEQR8GFs>

Outline:

- Solving one-step equation
- Solving 2-step equations
- Solving Multi-step equations

Solving 1-Step Equation (video):

<https://www.khanacademy.org/math/in-seventh-grade-math/simple-equations/equation-definition/v/one-step-equation-intuition>

Solve one-step equation:

Whatever you do to an equation, do the SAME thing to BOTH sides of that

Example 1:

Q: Solve for x in the equation: $x + 6 = -3$

A: Subtract 6 from both sides:

$$\begin{array}{r} x + 6 = -3 \\ -6 \quad -6 \\ \hline x = -9 \end{array}$$

Then the solution is $x = -9$

Example 2:

Q: Solve for x in the equation: $x - 5 = 7$

A: Subtract 6 from both sides:

$$\begin{array}{r} x - 6 = 7 \\ + 6 \quad + 6 \\ \hline x = 13 \end{array}$$

Then the solution is $x = 13$

Exercise 1:

Solve the following one-step equations:

- a) $x + 4 = 9$
- b) $x + 8 = 9$
- c) $x - 3 = 4$
- d) $x - 1 = 3$
- e) $y + 5 = 5$
- f) $x - 7 = 0$

Answers:

- a) $x = 5$
- b) $x = 1$
- c) $x = 7$
- d) $x = 4$
- e) $y = 0$
- f) $x = 7$

Solve 2-step Equations:

Solving 2-Step Equations (video):

<https://www.khanacademy.org/math/in-seventh-grade-math/simple-equations/equation-definition/v/why-we-do-the-same-thing-to-both-sides-two-step-equations>

Example 1:

Q: Solve for x in the following: $3x + 7 = 13$

A: Step1 – Subtract 7 from both sides

$$\begin{array}{r} 3x + 7 = 13 \\ - 7 = - 7 \\ \hline 3x = 6 \end{array}$$

Step 2: Divide both sides by 3:

$$\frac{3x}{3} = \frac{6}{3}$$

$$x = 2$$

Example 2:

Q: Solve for x in the following: $2x - 6 = 8$

A: Step1 – Add 6 to both sides:

$$\begin{array}{r} 2x - 6 = 8 \\ +6 = +6 \\ \hline \end{array}$$

$$2x = 14$$

Step 2: Divide both sides by 2:

$$\frac{2x}{2} = \frac{14}{2}$$

$$x = 7$$

Exercise 2:

Solve the following two-step equations:

- a) $5x + 4 = 29$
- b) $2x - 8 = 6$
- c) $4x - 3 = 17$
- d) $-6 + 2x = 6$
- e) $7y - 5 = 16$
- f) $3x - 21 = -6$

Answers:

- a) $x = 5$
- b) $x = 7$
- c) $x = 5$
- d) $x = 6$
- e) $y = 3$
- f) $x = 5$

Solving Multi-step Equations:

Video:

<https://www.khanacademy.org/math/algebra-basics/core-algebra-linear-equations-inequalities/solving-fancier-linear-equations/v/equations-3>

Example 1:

Q: Solve for x: $2x + 6x + 2 = 34$

A: With this equation, you have two terms with variables, so we can combine like terms

$$2x + 6x + 2 = 34$$

$$8x + 2 = 34 \text{ (combine like terms)}$$

$$8x + 2 - 2 = 34 - 2 \text{ (subtract 2 to both sides)}$$

$$8x = 32 \text{ (simplify)}$$

$$\frac{8x}{8} = \frac{32}{8} \text{ (divide each side by 8)}$$
$$x = 4$$

Exercise 3:

Solve the following multiple-step equations:

- a) $12 + 15x - 8 = 12x - 11$
- b) $6x - 8 = 3x + 1$
- c) $5x + 5 = 3x + 15$
- d) $3x - 15 = 2x + 6$
- e) $7x + 10 = 5x$

Answers:

- a) $x = -5$
- b) $x = 3$
- c) $x = 5$
- g) $x = 21$
- h) $x = -5$

Solving Equation – Revision (in Kahoot.it):

https://create.kahoot.it/?_ga=1.264521162.472929339.1451840295&deviceId=b5561ad2-c43c-4528-bcbb-ff51335858e1#quiz/55fdbdb1-3662-4c70-a119-1cddfe55c7a1