

# UNIT 4: EQUATIONS + INEQUALITIES

def

EQUATION: AN EQUATION IS A MATHEMATICAL SENTENCE CONTAINING AN EQUAL SIGN (=) THAT SHOWS 2 EQUIVALENT EXPRESSIONS.

$$4x + 2 = 6$$

↑ VARIABLE  
↑ COEFFICIENT  
↓ CONSTANTS

def

SOLUTION TO AN EQUATION: A NUMBER THAT CAN REPLACE A VARIABLE TO MAKE AN EQUATION TRUE.

$$x + 3 = 7$$

SOLUTION: 4

$$4 + 3 = 7$$
$$7 = 7 \checkmark$$

CHECK SOLUTION:

- 1) SUBSTITUTE
- 2) EVALUATE
- 3) YES OR NO

PROB  $x - 7 = 12$ ;  $x = 8$

SUB  $8 - 7 = 12$

EVAL  $1 \neq 12$

NO, NOT A SOLUTION

PROB  $x + 3 = 5$ ;  $x = 2$

SUB  $2 + 3 = 5$

EVAL  $5 = 5 \checkmark$

YES, A SOLUTION

## \* SOLVING ONE-STEP EQUATIONS \*

def

INVERSE OPERATIONS: OPPOSITE OPERATIONS THAT "UNDO" EACH OTHER.

$$+ \quad \text{INVERSE} \Rightarrow - \quad 2+3=5-3=2$$

$$- \quad \text{INVERSE} \Rightarrow +$$

$$\times \quad \text{INVERSE} \Rightarrow \div$$

$$\div \quad \text{INVERSE} \Rightarrow \times$$

PROPERTY OF EQUALITY: IF YOU ADD, SUBTRACT, MULTIPLY OR DIVIDE A NUMBER FROM BOTH SIDES OF AN EQUATION, THE TWO SIDES REMAIN EQUAL.

$$2 = 2$$

$$2+8 = 2+8$$

$$10 = 10 \checkmark$$

$$4 = 4$$

$$7 \cdot 4 = 7 \cdot 4$$

$$28 = 28 \checkmark$$

## SOLVING EQUATIONS EXAMPLES

ADDITION

ISOLATE THE VARIABLE

$$x + 10 = 17$$
$$\begin{array}{r} -10 \quad -10 \\ \hline x = 7 \end{array}$$

① INVERSE OPERATION  
② SOLUTION

SUBSTITUTION

$$7 + 10 = 17 \quad \textcircled{3}$$
$$17 = 17 \quad \checkmark \quad \textcircled{4}$$

CHECK

SUBTRACTION

$$x - 3 = 14$$
$$\begin{array}{r} +3 \quad +3 \\ \hline x = 17 \end{array}$$

①  
②

$$17 - 3 = 14 \quad \textcircled{3}$$
$$14 = 14 \quad \checkmark \quad \textcircled{4}$$

MULTIPLICATION

$$4x = 16$$
$$\begin{array}{r} 4 \quad 4 \\ \hline x = 4 \end{array}$$

①  
②

$$4 \cdot 4 = 16 \quad \textcircled{3}$$
$$16 = 16 \quad \checkmark \quad \textcircled{4}$$

DIVISION

$$2 \cdot \frac{x}{2} = 16 \cdot 2 \quad \textcircled{1}$$
$$x = 32 \quad \textcircled{2}$$

$$\frac{32}{2} = 16 \quad \textcircled{3}$$
$$16 = 16 \quad \checkmark \quad \textcircled{4}$$

MULTIPLICATION (FRACTION)

$$\frac{2}{1} \cdot \frac{1}{2} x = 10 \cdot \frac{2}{1} \quad \textcircled{1}$$
$$x = 20 \quad \textcircled{2}$$

MULTIPLY BY RECIPROCAL

$$\frac{1}{2} \cdot \frac{20}{1} = 10 \quad \textcircled{3}$$

$$\frac{20}{2} = 10$$

$$10 = 10 \quad \checkmark \quad \textcircled{4}$$