Lesson 15: True & False Number Sentences

- ☐ I can explain what the equality and inequality symbols including =, <, >, ≤, ≥ represent.
- ☐ I can determine if a number sentence is true or false based on the given symbol.
- ☐ I can identify values for the variables in equations and inequalities that result in a true number sentence.
- ☐ I can identify values for the variables in equations and inequalities that result in a false number sentence.

Opening Exercise

Determine what each symbol stands for and provide an example.

Symbol	What the Symbol Stands For	Example
$=$		
$>$		
$<$		
$\leq$		
$\geq$		

Example 1

For each equation or inequality your teacher displays, write the equation or inequality, and then substitute 3 for every x. Determine if the equation or inequality results in a true number sentence or a false number sentence.

Exercises

Substitute the indicated value into the variable, and state (in a complete sentence) whether the resulting number sentence is true or false. If true, find a value that would result in a false number sentence. If false, find a value that would result in a true number sentence.

$4 + x = 12$. Substitute 8 for x.

$3 > k + \frac{1}{4}$. Substitute $1\frac{1}{2}$ for k.

$3g > 15$. Substitute $4\frac{1}{2}$ for g.

$4.5 - d > 2.5$. Substitute 2.5 for d.

$\frac{f}{4} < 2$. Substitute 8 for f.

$8 \geq 32p$. Substitute $\frac{1}{2}$ for p.

$14.2 \leq h - 10.3$. Substitute 25.8 for h.

$\frac{w}{2} < 32$. Substitute 16 for w.

$4 = \frac{8}{h}$. Substitute 6 for h.

$18 \leq 32 - b$. Substitute 14 for b.

Exercise 11

State whether each number sentence is true or false. If the number sentence is false, explain why.

a. $4 + 5 > 9$

b. $3 \cdot 6 = 18$

c. $32 > \frac{64}{4}$

d. $78 - 15 < 68$

e. $22 \geq 11 + 12$

Example 2

Write true or false if the number substituted for g results in a true or false number sentence.

Substitute g with	$4g = 32$	$g = 8$	$3g \geq 30$	$g \geq 10$	$\frac{g}{2} > 2$	$g > 4$	$30 \geq 38 - g$	$g \geq 8$
8								
4								
2								
0								
10								

Example 3

State when the following equations/inequalities will be true and when they will be false.

a. $r + 15 = 25$

b. $6 - d > 0$

c. $\frac{1}{2}f = 15$

d. $\frac{y}{3} < 10$

e. $7g \geq 42$

f. $a - 8 \leq 15$

Exercises

Complete the following problems in pairs. State when the following equations and inequalities will be true and when they will be false.

12. $15c > 45$

13. $25 = d - 10$

14. $56 \geq 2e$

15. $\frac{h}{5} \geq 12$

16. $45 > h + 29$

17. $4a \leq 16$

18. $3x = 24$

Identify all equality and inequality signs that can be placed into the blank to make a true number sentence.

19. $15 + 9$ _____ 24

20. $8 \cdot 7$ _____ 50

21. $\frac{15}{2}$ _____ 10

22. 34 _____ $17 \cdot 2$

23. 18 _____ $24.5 - 6$

Lesson Summary

NUMBER SENTENCE: A *number sentence* is a statement of equality (or inequality) between two numerical expressions.

TRUTH VALUES OF A NUMBER SENTENCE: A number sentence that is an equation is said to be *true* if both numerical expressions evaluate to the same number; it is said to be *false* otherwise. True and false are called *truth values*. Number sentences that are inequalities also have truth values. For example, $3 < 4$, $6 + 8 > 15 - 12$, and $(15 + 3)^2 < 1000 - 32$ are all true number sentences, while the sentence $9 > 3(4)$ is false.