

## Unit 2 Day 19 - Real-World Applications of Inequalities

*Target: Write inequalities given a written explanation*

### Translating Written Explanations into Algebraic Inequalities...

Look for KEYWORDS!

$>$	$\geq$	$<$	$\leq$
is more than is greater than is larger than above	minimum at least is not less than not smaller than	is smaller than is less than below	maximum at most not more than is not greater than

A Few Examples...

In words...	Translation
Two is less than a number	$2 < x$
Four more than a number is greater than or equal to five.	$x + 4 \geq 5$
The maximum value of a number is 28.	$x \leq 28$
The sum of a number and nine is at least 81.	$x + 9 \geq 81$

**PART I:** Translate the verbal sentences into an algebraic inequality.

1.  $x$  is at most 50

$$x \leq 50$$

3. The minimum value of  $4x - 6$  is 54.

$$4x - 6 \geq 54$$

$$4x \geq 60$$

$$\boxed{x \geq 15}$$

5. Three times a number is smaller than  $2x + 4$

$$3x < 2x + 4$$

$$\boxed{x < 4}$$

2. The minimum value of a number is 10.

$$x \geq 10$$

4. The sum of  $5x$  and  $2x$  is at least 70

$$5x + 2x \geq 70$$

$$7x \geq 70$$

$$\boxed{x \geq 10}$$

6. 10 is greater than a number minus 6

$$10 > x - 6$$

$$\boxed{16 > x}$$

**PART II:** Translate and solve the verbal inequalities.

7. 6 subtracted from a number is greater than 4.

$$x - 6 > 4$$

$$\begin{array}{r} +6 \quad +6 \\ \hline x > 10 \end{array}$$

9. Three times a number minus 4 is no more than 12.

$$3x - 4 \leq 12$$

$$3x \leq 16$$

$$\boxed{x \leq 16/3}$$

8. Twice a number plus 6 is at least 30.

$$2x + 6 \geq 30$$

$$\div \quad \begin{array}{r} 2x \geq 24 \\ \hline x \geq 12 \end{array}$$

10. The quotient of a number and 7 is less than 11.

$$\frac{x}{7} < 11$$

$$\boxed{x < 77}$$

**\*Now let's go back and solve Part I**

**PART III:** Translate and solve the verbal compound inequalities.

1. A number is less than 6 and greater than 2.

$$2 < x < 6$$

2. A number is less than or equal to -7 or greater than 12.

$$x \leq -7 \text{ or } x > 12$$

2. A number is no less than -1.5 and fewer than 9.5.

$$-1.5 \leq x < 9.5$$

4. A number is at most 0 or at least 2.

$$x \leq 0 \text{ or } x \geq 2$$

**PART IV: Let's use this in a real-world scenario!**

The Elevation of Mount Rainer, a mountain in Washington, is 14,410 feet. The life zones on Mount Rainer can be approximately classified by elevation, as follows.

Low-elevation forest: above 1700 feet to 2500 feet

Mid-elevation forest: above 2500 feet to 4000 feet.

Alpine: Above 6500 feet to the summit (top of the mountain)

a) Write an inequality for the maximum height of the mountain.

$$h \leq 14,410$$

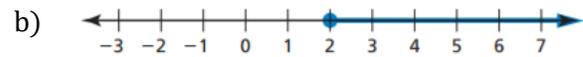
b) Write a compound inequality that represents the elevation range in the low-elevation forest zone.

$$1700 \leq h \leq 2500$$

c) Write a compound inequality that represents the elevation range of the alpine zone.

$$6500 \leq h \leq 14,410$$

**PART V: YOU TRY!** You and your partner should come up with a real-world scenario that represents the following graphs:



answers vary!

