Note

In mathematics, you must be able to represent intervals and identify smaller sections of a relation or a set of numbers.
You have used the following inequality symbols:
$>$ greater than
$<$ less than
$\geq$ greater than or equal to
$\leq$ less than or equal to
Linear Inequality is an inequality that contains an algebraic expression of degree 1
For example:
$5x + 3 \leq 6x - 2$
We solve inequality much the same as we do equations.

Ex. 1 - Solve an Inequality

Solve for all values of x.
$4x + 3 \geq 15$
$4x \geq 15 - 3$
$4x \geq 12$
$\frac{4x}{4} \geq \frac{12}{4}$
$x \geq 3$
We can also write out solution using set notation.
$\{x \in \mathbb{R} \mid x \geq 3\}$
$x \in [3, \infty)$

Solve for all values of x.
$7 - 3x \leq -2$
$-3x \leq -2 - 7$
$-3x \leq -9$
$\frac{-3x}{-3} \leq \frac{-9}{-3}$
$x \geq 3$
When dividing or multiplying by a negative constant, we need to reverse the inequality sign
$\{x \in \mathbb{R} \mid x \geq 3\}$
$x \in [3, \infty)$

Ex. 3 - Solving a Double Inequality

Solve for all values of x

$30 \leq 3(2x+4) - 2(x+1) \leq 46$

$30 \leq 6x + 12 - 2x - 2 \leq 46$

$30 \leq 4x + 10 \leq 46$

$30 - 10 \leq 4x + 10 - 10 \leq 46 - 10$

$20 \leq 4x \leq 36$

$\frac{20}{4} \leq \frac{4x}{4} \leq \frac{36}{4}$

$5 \leq x \leq 9$