M9 - 9.1 - One-Step Inequalities Notes

$x - 3 \geq 5$
$\quad +3 \quad +3$

$x \geq 8$

Add 3 to both sides.

$x + 4 < 7$
$\quad -4 \quad -4$
$x < 3$

Subtract 4 from both sides.

$3x \leq 9$

$\frac{3x}{3} \leq \frac{9}{3}$

$x \leq 3$

Divide 3 from both sides.

$\frac{x}{2} > 3$

$2 \times \frac{x}{2} > 3 \times 2$

$x > 6$

Multiply both sides by 2.

$-x \leq -4$

$\frac{-x}{-1} \geq \frac{-4}{-1}$

$x \geq 4$

Divide/multiply both sides by a negative:

Change the direction of the sign

Proof

$-x \leq -4$

$\frac{-x}{-1} \geq \frac{-4}{-1}$

$x \geq 4$

=

$-x \leq -4$
$+x \quad +x$
$0 \leq -4 + x$
$+4 \quad +4$
$4 \leq x$
$x \geq 4$

M9 - 9.1 - Two-Step Inequalities Notes

To determine the size of the variable to make the inequality true:

$$4y + 2 > 18$$
$$\quad -2 \quad -2$$

$$\frac{4y}{4} > \frac{16}{4}$$

$y > 4$ **y must be greater than 4 in order for $4y + 2 > 18$ to be true.**

$$-3x - 5 \leq 4$$
$$\quad +5 \quad +5$$

$$-3x \leq 9$$

$$\frac{-3x}{-3} \geq \frac{9}{-3}$$

$x \geq -3$ **x must be greater than or equal to -3 in order for $-3x - 5 \leq 4$ to be true.**

$$-5x \leq 4 - 3x$$
$$+3x \quad\quad + 3x$$

$$-2x \leq 4$$

$$\frac{-2x}{-2} \geq \frac{4}{-2}$$

$x \geq -2$ **x must be greater than or equal to -2 in order for $-5x \leq 4 - 3x$ to be true.**

M9 - 9.1 - ± Inequalities Square Roots Notes

To determine the size of the variable to make the inequality true:

$x^2 \geq 16$

$\sqrt{x^2} \geq \pm\sqrt{16}$

$x \geq +4$ $\quad$ $x \leq -4$ $\quad$ *Change the direction of the sign on the negative.*

x must be less than or equal to -4 and greater than or equal to 4 in order for $x^2 \geq 16$ to be true.

$x^2 + 6 \geq 22$
$\quad -6 \quad -6$

$x^2 \geq 16$

$\sqrt{x^2} \geq \pm\sqrt{16}$

$x \geq 4$ $\quad$ $x \leq -4$ $\quad$ *Change the direction of the sign on the negative.*

x must be less than or equal to -4, and greater than or equal to 4 in order for $x^2 + 6 \geq 22$ to be true.