## Unit 6 Lesson 15: Efficiently Solving Inequalities

## 1 Lots of Negatives (Warm up)

## Student Task Statement

Here is an inequality: $-x \geq-4$.

1. Predict what you think the solutions on the number line will look like.
2. Select all the values that are solutions to $-x \geq-4$ :
a. 3
b. -3
C. 4
d. -4
e. 4.001
f. -4.001
3. Graph the solutions to the inequality on the number line:


## 2 Inequalities with Tables

## Student Task Statement

1. Let's investigate the inequality $x-3>-2$.

| $x$ | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $x-3$ | -7 |  | -5 |  |  |  | -1 |  | 1 |

a. Complete the table.
b. For which values of $x$ is it true that $x-3=-2$ ?
c. For which values of $x$ is it true that $x-3>-2$ ?
d. Graph the solutions to $x-3>-2$ on the number line:

2. Here is an inequality: $2 x<6$.
a. Predict which values of $x$ will make the inequality $2 x<6$ true.
b. Complete the table. Does it match your prediction?

| $x$ | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 |
| :---: | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $2 x$ |  |  |  |  |  |  |  |  |  |

c. Graph the solutions to $2 x<6$ on the number line:

3. Here is an inequality: $-2 x<6$.
a. Predict which values of $x$ will make the inequality $-2 x<6$ true.
b. Complete the table. Does it match your prediction?

| $x$ | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $-2 x$ |  |  |  |  |  |  |  |  |  |

c. Graph the solutions to $-2 x<6$ on the number line:

d. How are the solutions to $2 x<6$ different from the solutions to $-2 x<6$ ?

## 3 Which Side are the Solutions?

## Student Task Statement

1. Let's investigate $-4 x+5 \geq 25$.
a. Solve $-4 x+5=25$.
b. Is $-4 x+5 \geq 25$ true when $x$ is 0 ? What about when $x$ is 7 ? What about when $x$ is -7 ?
c. Graph the solutions to $-4 x+5 \geq 25$ on the number line.

2. Let's investigate $\frac{4}{3} x+3<\frac{23}{3}$.
a. Solve $\frac{4}{3} x+3=\frac{23}{3}$.
b. Is $\frac{4}{3} x+3<\frac{23}{3}$ true when $x$ is 0 ?
c. Graph the solutions to $\frac{4}{3} x+3<\frac{23}{3}$ on the number line.

3. Solve the inequality $3(x+4)>17.4$ and graph the solutions on the number line.

4. Solve the inequality $-3\left(x-\frac{4}{3}\right) \leq 6$ and graph the solutions on the number line.

