DISTRIBUTE!

LEARNING GOAL

1. I can apply the distributive law to solve linear inequalities in one variable.

REVIEW
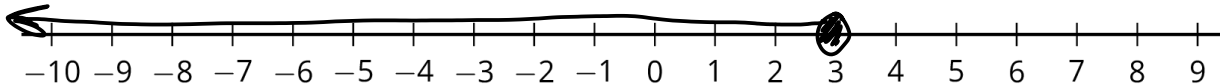
Solve $20 - 6p \geq 2$

$$-20 \qquad\qquad -20$$

$$-6p \geq -18$$
$$\frac{-6p}{-6} \leq \frac{-18}{-6}$$

$$p \leq 3$$

Graph:

Check:

$x = 2$

$20 - 6(2) \geq 2$

$20 - 12 \geq 2$

$8 \geq 2 \quad \checkmark$

MAKING THE GRADE

Jenna received a 70% on a math assignment. To get at least an 80% in math class, her grade on the next assignment must be a solution to the inequality:

$$\frac{1}{2}\left(70 + x\right) \geq 80$$

On the next slide, you will help her find what grade she needs.
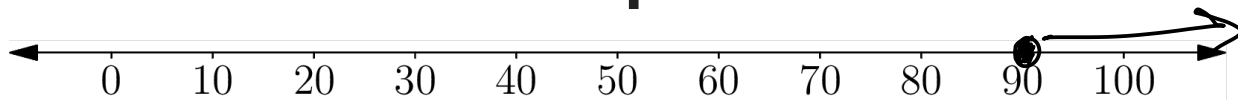
EXAMPLE 1

Solve $\frac{1}{2}(70 + x) \geq 80$

$$\frac{1}{2} \cdot 70 + \frac{1}{2}x \geq 80$$

$$35 + \frac{1}{2}x \geq 80$$

$$-35 \qquad\qquad -35$$

$$2 \cdot \frac{1}{2}x \geq 45 \cdot 2$$

$$x \geq 90$$

Check:

$$x = 100$$

$$\frac{1}{2}(70 + 100) \geq 80$$

$$\frac{1}{2}(170) \geq 80$$

$$85 \geq 80 \checkmark$$

Graph:

FIND THE MISTAKE

One of the solutions contains a mistake. What is the mistake? Circle it and explain.

Solution 1

$$2(x + 10) \geq 30$$
$$2x + 20 \geq 30$$
$$\underline{-20 \quad -20}$$
$$2x \geq 10$$
$$x \geq 5$$

Solution 2

$$2(x + 10) \geq 30$$
$$\underline{-10 \quad -10}$$
$$2x \geq 20$$
$$x \geq 10$$

We need to distribute before we can eliminate the constant.

EXERCISE 1

Solve $13 - 2a \geq 21$

$$-13 \qquad\qquad -13$$

$$\frac{-2a}{-2} \leq \frac{8}{-2}$$

$$a \leq -4$$

Graph your solution:
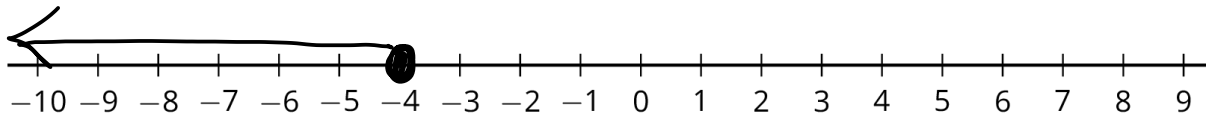
Check:

Let's check that
$a = -5$ is a solution

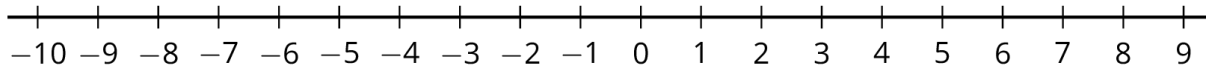$13 - 2(-5) \geq 21$

$13 - (-10) \geq 21$

$13 + 10 \geq 21$

$\checkmark$

$23 \geq 21 \quad \checkmark$

EXERCISE 2

Solve $4 + 3t \leq -20$

Check:

Graph:

$$-10 \quad -9 \quad -8 \quad -7 \quad -6 \quad -5 \quad -4 \quad -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \quad 9$$

FIND THE MISTAKE

One of the solutions contains a mistake. What is the mistake? Circle it and explain.

Solution 1

$$x + 2 > 8$$
$$-2 \quad -2$$
$$x > 6$$

Solution 2

$$x + 2 > 8$$
$$-2 \quad -2$$
$$x < 6$$

the sign does not change when you add/subtract the same number from both sides

FIND THE MISTAKE

One of the solutions contains a mistake. What is the mistake? Circle it and explain.

Solution 1

$$-\frac{1}{2}x > 8$$

$$(-2) \cdot -\frac{1}{2}x > (-2) \cdot 8$$

$$x > -16$$

Solution 2

$$-\frac{1}{2}x > 8$$

$$(-2) \cdot -\frac{1}{2}x < (-2) \cdot 8$$

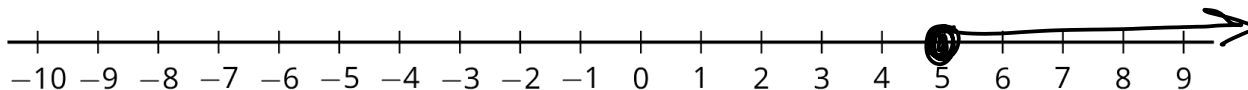$$x < -16$$

DISTRIBUTE TO SOLVE

Solve $2(5 + 3a) \geq 40$

$$2 \cdot 5 + 2 \cdot 3a \geq 40$$

$$10 + 6a \geq 40$$

$$ -10 -10$$

$$\frac{6a}{6} \geq \frac{30}{6}$$

$$a \geq 5$$

Check:

Check that $a = 6$
is a solution

$$2(5 + 3 \cdot 6) \geq 40$$

$$2(5 + 18) \geq 40$$

$$2 \cdot 23 \geq 40$$

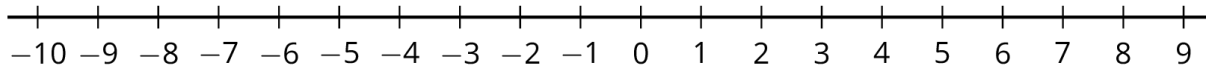$$46 \geq 40 \checkmark$$

Graph:

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  −10 −9 −8 −7 −6 −5 −4 −3 −2 −1  0  1  2  3  4  5  6  7  8  9
```

DISTRIBUTE TO SOLVE

Solve $3(4 - 2a) \geq 18$

Check:

Graph:

$$\begin{array}{c} \text{—10 —9 —8 —7 —6 —5 —4 —3 —2 —1 \ 0 \ 1 \ 2 \ 3 \ 4 \ 5 \ 6 \ 7 \ 8 \ 9} \end{array}$$

FIND THE MISTAKE

One of the solutions contains a mistake. What is the mistake? Circle it and explain.

Solution 1	Solution 2
$4(x+4) \leq 24$	$4(x+4) \leq 24$
$4x + 4 \leq 24$	$4x + 16 \leq 24$
$-4 \quad -4$	$-16 \quad -16$
$4x \leq 20$	$4x \leq 8$
$x \leq 5$	$x \leq 2$

FINDING THE AVERAGE

Edmond took 3 tests and scored 80%, 90%, and 84%. What was his average test score?