### LT 3: I can represent real-world situations with equations, inequalities, and absolute value.

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1. For a scholarship competition, Eva had to write an essay. For the essay Eva had to write more than 250 words, but it couldn't exceed 500 words. Write an inequality that demonstrates Eva's situation, then graph it.

2. Mars has a maximum temperature of -7 °C at the equator and a minimum temperature of -133 °C at the winter pole. Write an inequality that describes the possible temperatures on Mars, then graph it.

3. At a carnival, the cost to play a bowling game is $2 plus $0.25 for each attempt to knock over the pins. Which inequality would you use to find the number of attempts, $a$, you can make if you have $10?

A. $0.25a + 2 \geq 10$
B. $0.25a + 2 \leq 10$
C. $0.25a + 2 < 10$
D. $0.25a + 2 > 10$

4. Tom earns $50 to start a painting job and $20 per hour to complete it. All jobs he accepts earn him at least $300. If $h$ represents the number of hours spent painting, which inequality describes Tom's situation?

A. $50 + 20h > 300$
B. $50 + 20h \geq 300$
C. $50 + 20h < 300$
D. $50 + 20h \leq 300$

5. You are stacking books on a shelf that has a height of 66 centimeters. Each book has a thickness of 4 centimeters. Write and solve an inequality to find the possible numbers of books that you can stack.

6. A blank CD can hold 70 minutes of music. So far you have burned 25 minutes of music onto the CD. You estimate that each song lasts 4 minutes. Write and solve an inequality that shows the possible numbers of additional songs that you can burn onto the CD, then graph it.
7. At the TX Design Company, the average starting salary for a new designer is $33,600, but the actual salary could differ from the average by as much as $1,560. Which inequality could be used to determine if a salary, $x$, falls within this range?

A. $|x - 1,560| \leq 33,600$
B. $x - 33,600 \leq 1,560$
C. $|x - 33,600| \geq 1,560$
D. $|x - 33,600| \leq 1,560$

8. Caleb is a machinist at Golden Eagle Chopper Shop. To ensure the reliability of the motorcycle engines produced at the shop, Caleb machines each cylinder to a 4.01" diameter with a tolerance of 0.0002". Which inequality could be used to determine if a cylinder's diameter, $x$, is acceptable?

A. $4.01 - x < 0.0002$
B. $|x - 4.01| \leq 0.0002$
C. $|x - 4.01| \geq 0.0002$
D. $x - 4.01 > 0.0002$

9. An essay contest requires that essay entries consist of 500 words with an absolute deviation of at most 30 words. Write an absolute value inequality to represent this.

10. A candy manufacture puts 240 pieces of candy into each bag. The bag can be off by 8 pieces. Write an absolute value inequality that displays the acceptable amount of candy pieces that can be in a bag.

11. Which inequality is represented by this graph?

A. $|x| < 2$
B. $|x| \leq 2$
C. $|x| > 2$
D. $|x| \geq 2$

12. Which inequality has the solution represented by this graph?

A. $|x + 1| \leq 2$
B. $|x - 2| \leq 1$
C. $|x + 2| \leq 1$
D. $|x - 1| \leq 2$
<table>
<thead>
<tr>
<th>Box 8</th>
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<tr>
<th><strong>Solve.</strong></th>
<th><strong>Solve and graph.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>$</td>
<td>2x</td>
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<tr>
<td>$-5 \leq x \leq -5$</td>
<td>$-41 \leq x \leq -4$</td>
</tr>
<tr>
<td>$</td>
<td>2x</td>
</tr>
<tr>
<td>No Solution</td>
<td>$\frac{3x}{3} \leq \frac{30}{3}$  $\frac{3x}{3} \geq \frac{-30}{3}$</td>
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<tr>
<td>$x \leq 10$</td>
<td>$x \geq -10$</td>
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</table>
For 1-4, find the absolute value.

1. $|42| = 42$
2. $|-6.3| = 6.3$
3. $|2.94| = 2.94$
4. $|-3/7| = 3/7$

For 5-7, solve the inequality and graph the solutions. (2 answers!)

5. $|x| < 6$
   - $x < 6$
   - $x > -6$

6. $|2x| \leq 12$
   - $\frac{2x}{2} \leq \frac{12}{2}$
   - $x \leq 6$
   - $\frac{2x}{2} \geq \frac{-12}{2}$
   - $x \geq -6$

7. $|-2x| \geq -22$
   - All real numbers

8. $|3x + 4| < 5$
   - $3x + 4 < 5$
   - $\frac{3x + 4}{-4} > -\frac{4}{4}$
   - $\frac{3x}{3} < \frac{1}{3}$
   - $x < \frac{1}{3}$
   - $3x + 4 > -5$
   - $\frac{3x + 4}{-4} > -\frac{4}{4}$
   - $\frac{3x}{3} > -\frac{9}{3}$
   - $x > -3$

9. $|2x - 5| \geq 8$
   - $2x - 5 \geq 8$
   - $\frac{2x - 5}{5} \geq \frac{8}{5}$
   - $\frac{2x}{2} \geq \frac{13}{2}$
   - $x \geq 6.5$
   - $2x - 5 \leq -8$
   - $\frac{2x - 5}{-5} \leq \frac{-8}{-5}$
   - $\frac{2x}{2} \leq \frac{-3}{2}$
   - $x \leq -1.5$
10. \[ \frac{|2x - 3| + 7 < 33}{2x + 3} \leq 26 \]

\[ \begin{align*}
2x - 3 & < 26 \\
+3 & +3 \\
2x & < 29 \\
\frac{2x}{2} & = 14.5
\end{align*} \]

\[ x < 14.5 \]

\[ \begin{align*}
2x - 3 & > -26 \\
+3 & +3 \\
2x & > -23 \\
\frac{2x}{2} & = -11.5
\end{align*} \]

\[ x > -11.5 \]

11. \[ \frac{3|2x + 3| \leq 18}{3} \leq 6 \]

\[ \begin{align*}
2x + 3 & \leq 6 \\
-3 & -3 \\
2x & \leq 3 \\
\frac{2x}{2} & = 1.5
\end{align*} \]

\[ x \leq 1.5 \]

\[ \begin{align*}
2x + 3 & \geq -6 \\
-3 & -3 \\
2x & \geq -9 \\
\frac{2x}{2} & = -4.5
\end{align*} \]

\[ x \geq -4.5 \]

12. \[ \frac{|x + 3| - 4 \geq 20}{4} \geq 24 \]

\[ \begin{align*}
x + 3 & \geq 24 \\
-3 & -3 \\
x & \geq 21
\end{align*} \]

13. \[ \frac{|3x - 7| - 8 > 3}{8} > 11 \]

\[ \begin{align*}
\frac{3x - 7}{8} & > 11 \\
+7 & +7 \\
3x & > 18 \\
\frac{3x}{3} & = 6
\end{align*} \]

\[ x > 6 \]

\[ \begin{align*}
\frac{3x - 7}{8} & < -11 \\
+7 & +7 \\
3x & < -4 \\
\frac{3x}{3} & < -4 \frac{2}{3}
\end{align*} \]

\[ x < -5 \frac{1}{3} \]

14. \[ \frac{\frac{3}{4} |x - 8| < 24}{3} \leq \frac{3}{4} \]

\[ \begin{align*}
|x - 8| & < 24 \frac{3}{4} \\
\frac{1}{3} & \frac{1}{3} \\
|x - 8| & < 32
\end{align*} \]

\[ \begin{align*}
x - 8 & < 32 \\
+8 & +8 \\
x & < 40
\end{align*} \]

\[ x > -24 \]
<table>
<thead>
<tr>
<th>pg. #</th>
<th>Learning Targets</th>
<th>CW (teacher sign)</th>
<th>Practice Assignment</th>
<th>Practice Assignment (teacher sign)</th>
<th>Understanding?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>1a. I can write and graph inequalities.</td>
<td>math</td>
<td>2-3</td>
<td>math</td>
<td></td>
</tr>
<tr>
<td>4-7</td>
<td>1b. I can solve one and two step inequalities.</td>
<td>rocks</td>
<td>5-7</td>
<td>rocks</td>
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</tr>
<tr>
<td>8-10</td>
<td>1c. I can solve multi-step inequalities.</td>
<td>yes</td>
<td>8-10</td>
<td>yes</td>
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</tr>
<tr>
<td>11-12</td>
<td>Inequalities Review</td>
<td>it</td>
<td>11-12</td>
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<td>13-15</td>
<td>2a. I can solve absolute value equations.</td>
<td>really</td>
<td>14-15</td>
<td>really</td>
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</tr>
<tr>
<td>16-18</td>
<td>2b. I can solve and graph absolute value inequalities.</td>
<td>truly</td>
<td>17-18</td>
<td>truly</td>
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</tr>
<tr>
<td>19-21</td>
<td>3. I can represent real-world situations with equations, inequalities, and absolute value.</td>
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<td>20-21</td>
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Test is next Toosday
LT 3: I can represent real-world situations with equations, inequalities, and absolute value.

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1. Write an inequality that describes the graph below.

A. \( x < 60 \)

B. \( 22 \leq x \leq 34 \)
2. Write and graph an inequality that describes the situation.

A. No one under age 17 will be admitted without a parent or guardian.  \[ x < 17 \]

B. Three or more people make a carpool.  \[ x \geq 3 \]
3. Keith has $500 in a savings account at the beginning of the summer. He wants to have at least $200 in the account by the end of the summer. He withdraws $25 each week for food, clothes, and movie tickets.

A) Write an inequality that represents Keith's situation.

\[ -25 \times +500 \geq 200 \]
\[ \frac{-500}{-25} \]
\[ x \leq 12 \]

B) How many weeks can Keith withdraw money from his account?
4. Yellow Cab Taxi charges a $1.75 flat rate in addition to $0.65 per mile. Katie has no more than $10 to spend on a ride.

A) Write an inequality that represents Katie's situation.

\[ m = 0.65 \quad \quad b = 1.75 \quad \quad 0.65x + 1.75 \leq 10 \quad \quad x \leq 12.7 \]

She can travel 12.7 miles or less.

B) How many miles can Katie travel without exceeding her limit?
5. Ezra received $50 from his grandparents for his birthday. He makes $7.50 each week for odd jobs he does around the neighborhood. Since his birthday, he has saved more than enough to buy the $120 gift he wants to buy for his parents' 20th wedding anniversary.

A) Write an inequality that represents Ezra's situation.

\[ m = 7.50 \quad b = 50 \quad 7.50x + 50 > 120 \]

\[ x > 9.3 \]

B) How many weeks ago was Ezra's birthday?
6. The boys and girls soccer clubs are trying to raise money for new uniforms. The boys' soccer club is selling candy bars for $2 a piece and the girls' soccer club is selling candles for $4. They must raise at least $800.

A) Write an inequality that represents the income from the two fundraisers.

B) If the girls sold 100 candles, how many candy bars must the boys sell?
7.

The "normal" human body temperature is 98.6°F. A temperature, \( x \), that differs from normal by at least 2°F is considered unhealthy. Which inequality could be used to determine if a temperature is unhealthy?

\[
\begin{align*}
\text{A} & \quad |x - 98.6| \geq 2 \\
\text{B} & \quad x - 98.6 > 2 \\
\text{C} & \quad 98.6 - x < 2 \\
\text{D} & \quad |x - 98.6| \leq 2
\end{align*}
\]

\[96.6 \leq 98.6^\circ F \quad \frac{x - 98.6 \geq 2}{\text{healthy}} \]

\[\frac{x - 98.6 \geq 2}{+98.6} \quad \frac{x \geq 100.6}{\text{healthy}} \]

\[\frac{x - 98.6 \leq 2}{+98.6} \quad \frac{x \leq 96.6}{\text{unhealthy}} \]
A clothing designer is selecting models to walk the runway for her fashion show. The designer prefers models that are no more than 3 inches away from being 5'10". Since 5'10" is the same as 70", which inequality could be used to determine if a model's height, x, is within the designer's preferred height range?

A. \( x - 70" \leq 3" \)
B. \( |x - 70"| \leq 3" \)
C. \( x - 70" \geq 3" \)
D. \( |x - 70"| \geq 3" \)
You are preheating an oven to 350°F. The thermometer reads 346°F. The measured temperature has an absolute deviation of at most 2°F. Write and solve an inequality to decide if the oven is preheated yet.

\[ |x - \text{perfect} | \leq 2 \]

\[ |x - 350| \leq 2 \]

\[ x - 350 \leq 2 \]
\[ x \leq 352 \]

\[ x - 350 \geq -2 \]
\[ x \geq 348 \]

\[ x \leq 352 \]
\[ x \geq 348 \]
10.

A golf ball manufacture puts 390 golf balls in each box. The box can be off by 6 golf balls. **Write** and **solve** an absolute value inequality that displays the acceptable amount of golf balls that can be in a box.

\[ |x - 390| < 6 \]

\[ x \geq 384 \quad x \leq 396 \]
SHOW WORK!

Write down CW problems

CW p.20-21 (4, 6, 7, 9)

P p.20-21 (all)
1. For a scholarship competition, Eva had to write an essay. For the essay Eva had to write more than 250 words, but it couldn't exceed 500 words. Write an inequality that demonstrates Eva's situation, then graph it.

\[ 250 < x \leq 500 \]

2. Mars has a maximum temperature of \(-7^\circ C\) at the equator and a minimum temperature of \(-133^\circ C\) at the winter pole. Write an inequality that describes the possible temperatures on Mars, then graph it.

\[ -133 \leq x \leq -7 \]

3. At a carnival, the cost to play a bowling game is $2 plus $0.25 for each attempt to knock over the pins. Which inequality would you use to find the number of attempts, \(a\), you can make if you have $10?

A. \(0.25a + 2 \geq 10\)
B. \(0.25a + 2 \leq 10\)
C. \(0.25a + 2 < 10\)
D. \(0.25a + 2 > 10\)

4. Tom earns $50 to start a painting job and $20 per hour to complete it. All jobs he accepts earn him at least $300. If \(h\) represents the number of hours spent painting, which inequality describes Tom's situation?

A. \(50 + 20h > 300\)
B. \(50 + 20h \geq 300\)
C. \(50 + 20h < 300\)
D. \(50 + 20h \leq 300\)

5. You are stacking books on a shelf that has a height of 66 centimeters. Each book has a thickness of 4 centimeters. Write and solve an inequality to find the possible numbers of books that you can stack.

\[ \frac{4x}{4} \leq 66 \]

\[ x \leq 16.5 \]

You can stack up to 16 books.

6. A blank CD can hold 70 minutes of music. So far you have burned 25 minutes of music onto the CD. You estimate that each song lasts 4 minutes. Write and solve an inequality that shows the possible numbers of additional songs that you can burn onto the CD, then graph it.

\[ \frac{4x}{4} \leq 45 \]

\[ x \leq 11.25 \]

You can burn up to 11 more songs.
7. At the TX Design Company, the average starting salary for a new designer is $33,600, but the actual salary could differ from the average by as much as $1,560. Which inequality could be used to determine if a salary, x, falls within this range?
   A. |x - 1,560| ≤ 33,600
   B. x - 33,600 ≤ 1,560
   C. |x - 33,600| ≥ 1,560
   D. |x - 33,600| ≤ 1,560

8. Caleb is a machinist at Golden Eagle Chopper Shop. To ensure the reliability of the motorcycle engines produced at the shop, Caleb machines each cylinder to a 4.01" diameter with a tolerance of 0.0002". Which inequality could be used to determine if a cylinder's diameter, x, is acceptable?
   A. 4.01 - x < 0.0002
   B. |x - 4.01| ≤ 0.0002
   C. |x - 4.01| ≥ 0.0002
   D. x - 4.01 > 0.0002

9. An essay contest requires that essay entries consist of 500 words with an absolute deviation of at most 30 words. Write an absolute value inequality to represent this.
   \[|x - 500| ≤ 30\]

10. A candy manufacture puts 240 pieces of candy into each bag. The bag can be off by 8 pieces. Write an absolute value inequality that displays the acceptable amount of candy pieces that can be in a bag.
   \[|x - 240| ≤ 8\]

11. Which inequality is represented by this graph?
   A. |x| < 2
   B. |x| ≤ 2
   C. |x| > 2
   D. |x| ≥ 2

12. Which inequality has the solution represented by this graph?
   A. \[\frac{x - 2}{2} ≤ 1\]
   B. \[\frac{x + 2}{2} + 1 ≤ \frac{x + 2}{2}\]
   C. \[\frac{x - 2}{2} ≥ -1\]
   D. \[\frac{x + 2}{2} + 1 ≥ \frac{x + 2}{2}\]