Warm Up

1.) A. Solve the inequality: 3 - (7 - 2x) > -8.

B. List three numbers that make the inequality true:

\[3 - 7 + 2x > -8\]
\[-4 + 2x > -8\]
\[2x > -4\]
\[x > -2\]

\[3 - (1 - 2(1)) \geq -8\]
\[3 - (1 - 2) \geq -8\]
\[3 - 5 \geq -8\]
\[-2 \geq -8\]

2.) The length of a rectangle is 5 m greater than the width. The perimeter is 150 m. Find the width and length.

\[L = w + 5\]
\[w + 5\]
\[w + 5 + w + w + 5 + w = 150\]
\[4w + 10 = 150\]
\[-10\]
\[4w = 140\]
\[4\]
\[w = 35\]

\[L = w + 5\]
\[L = 35 + 5\]
\[L = 40\]

3.) Solve for x: Ax + By = C.

\[-By\]
\[Ax = -By + C\]

\[\frac{Ax}{A} = \frac{-By + C}{A}\]

\[x = -\frac{By + C}{A}\]
Solving Inequalities Practice

**#4**
\[
\frac{4x + 2}{-4x} \geq \frac{5x - 4}{-4x} - \frac{4x}{-4x} \\
\frac{2}{-4x} \geq x - 4 \\
\frac{+4}{+4} \geq x \\
x \leq 6
\]

2, 4, 3

**#7**
\[
1 - a(x + 1) \leq 3(x - 2) \\
-a(x - 2) \leq 3x - 6 \\
-1 - ax - 2 \leq 3x - 6 \\
ax \cdot +ax \\
-1 \leq 5x - 6 \\
+6 +6 \\
\frac{5 - 5x}{5} \leq \frac{5}{5} \\
\frac{x}{5} \leq 1 \\
x \leq \frac{5}{1} \\
x \leq 5
\]

\(x \geq 1\)

2, 3, 4, ...

\[\omega x - 5(\omega x + 9) \leq 2x + 3\]
\[\omega x - 10x - 45 \leq 2x + 3\]
\[-4x - 45 \leq 2x + 3\]
\[+4x + 4x\]
\[-45 - 3 \leq \omega x + 3\]
\[-48 \leq \omega x\]
\[-8 \leq x\]

x \geq -8
### Key Words

<table>
<thead>
<tr>
<th></th>
<th>≤ (less than or equal to)</th>
<th>≥ (greater than or equal to)</th>
</tr>
</thead>
<tbody>
<tr>
<td>at most</td>
<td>is not equal to</td>
<td>at least</td>
</tr>
<tr>
<td>maximum</td>
<td>is not the same as</td>
<td>minimum</td>
</tr>
<tr>
<td>bottom</td>
<td>is different / differs from</td>
<td>top</td>
</tr>
<tr>
<td>is no more than</td>
<td></td>
<td>is no less than</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>&lt; (less than)</th>
<th>= (equal)</th>
<th>&gt; (greater than)</th>
</tr>
</thead>
<tbody>
<tr>
<td>is less than</td>
<td>is / are / will be /only</td>
<td>more than</td>
<td></td>
</tr>
<tr>
<td>is under</td>
<td>is the same as</td>
<td>above</td>
<td></td>
</tr>
<tr>
<td>is below</td>
<td>that is equal to</td>
<td>over</td>
<td></td>
</tr>
<tr>
<td>shorter / smaller than</td>
<td>exactly</td>
<td>greater / larger than</td>
<td></td>
</tr>
<tr>
<td>fewer than</td>
<td>half ( = .5* or ½ *)</td>
<td>exceeds / increased</td>
<td></td>
</tr>
<tr>
<td>is lower than</td>
<td></td>
<td>longer than</td>
<td></td>
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<tr>
<td>beneath</td>
<td></td>
<td>is higher than</td>
<td></td>
</tr>
<tr>
<td>a better deal</td>
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</tbody>
</table>

### Additional Notes
- "is less than" can also be used as "is lesser than".
- "is equal to" can also be used as "is the same as".
- "is greater than" can also be used as "is higher than".
- "is the same as" can also be used as "is identical to".
- "greater / larger than" can also be used as "higher than".
- "exceeds / increased" can also be used as "outperforms" or "has increased"
- "intermediate / between" can also be used as "mediocre".
- "more / greater than" can also be used as "larger than".
- "less / smaller than" can also be used as "lower than".
Translate the verbal phrases into inequalities.

1.) $x$ is \underline{at most} 6  
\[ x \leq 6 \]

2.) You must be \underline{at least} 25 years old to rent a car. 
\[ x \geq 25 \]

3.) A number that is \underline{at least} 90  
\[ p \geq 90 \]

4.) A number that is \underline{at most} 30  
\[ q \leq 30 \]
1.) Katie had 38 recipes for desserts in her file box before adding x new recipes. If she now has at least 50 recipes, which inequality could be used to determine the number of new recipes she added to her files?

A. \( x + 50 \geq 38 \)  
B. \( x + 38 \geq 50 \)  
C. \( x > 50 + 38 \)  
D. \( x + 38 \leq 50 \)

2.) Juanita wants to buy several cans of beans that sell for $1.29 per can and a loaf of bread that costs $1.40. Juanita only has a twenty-dollar bill. Which inequality could she use to find out how many cans \( x \) she is able to purchase?

A. \( 1.40x + 1.29 \geq 20 \)  
B. \( 1.29x + 1.40 \geq 20 \)  
C. \( 20x + 1.40 \leq 20 \)  
D. \( 1.29x + 1.40 \leq 20 \)
Write and solve the inequalities for the scenarios below.

1. The charge to rent a car for a day is $16. There is an additional charge of $0.12 per mile. What is the greatest number of miles that a rented car can be driven in a day if the total bill is to be less than $40?

   A. 149 miles
   B. 160 miles

   \[16 + 0.12m < 40\]
   \[-0.16 < 0.12m\]
   \[m < 200\]

   C. 190 miles
   D. 199 miles
2.) The cost to print a book is $54. The paper is an additional charge of $0.05 per page. What is the greatest number of pages that a book can be printed if the total bill is to be less than $60?

A. 1200 pages  

\[0.05p + 54 \leq 60\]

\[-54\]

\[0.05p \leq 6\]

\[\frac{0.05}{0.05}p \leq \frac{6}{0.05}\]

\[p \leq 120\]

B. 120 pages  

C. 60 pages  

D. 1080 pages
3.) Mrs. Smith wrote “Eight less than three times a number is greater than fifteen” on the board. If \( x \) represents the number, which inequality is a correct translation of this statement?

- a) \( 3x - 8 > 15 \)
- b) \( 3x - 8 < 15 \)
- c) \( 8 - 3x > 15 \)
- d) \( 8 - 3x < 15 \)

4.) Joan needed $100 to buy a graphing calculator for her math class. Her neighbor will pay her $5 per hour to babysit and her father gave her $10 for cleaning her room. What is the minimum amount of hours she will need to babysit in order for her to buy her calculator?

\[
\begin{align*}
5h + 10 & \geq 100 \\
-10 & \hspace{1cm} -10 \\
5h & \geq 90 \\
\frac{5h}{5} & \hspace{1cm} \frac{90}{5} \\
h & \geq 18
\end{align*}
\]

\( h = \text{hours} \)

at least 18 hours
5.) A school club sells candy bars for a fundraiser. If the club makes a profit of 25¢ on each candy bar and spends $25 on advertising, how many candy bars must be sold to make a profit of at least $100?