Practice Problems

1. Solve the following equations for the given variable. Show all steps. Simplify your answers.
   a) $I = Prt$ Solve for $t$
   b) $2x + 3y = 6$ Solve for $y$

   c) $A = B(C + D)$ Solve for $D$
   d) $A = p + prt$ Solve for $r$

   e) $6x - y = 11$ Solve for $y$
   f) $A = P(1 + r)^t$ Solve for $P$

   g) $r = \frac{C}{2\pi}$ Solve for $C$
   h) $3x - 5y = 8$ Solve for $y$

   i) $P = A - B - C$ Solve for $B$
   j) $ax^2 + bx + c = 0$ Solve for $b$. 
2. Given values: \( x = 0 \quad x = -1 \quad x = -5 \quad x = 3 \quad x = 5 \quad x = \frac{-5}{3} \)

   a. Which of the given values are in the solution set for \( x < 3 \)?

   b. Which of the given values are in the solution set for \( x \geq -1 \)?

   c. Which of the given values are in the interval \((-2, \infty)\)?

   d. Which of the given values are in the interval \((-1, 5]\)?

   e. Which of the given values are in the interval \(-5 < x \leq 3\)?

3. Complete the table below:

<table>
<thead>
<tr>
<th>Inequality</th>
<th>Graph</th>
<th>Interval Notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>( x &gt; 8 )</td>
<td>( -\infty \leftarrow \infty )</td>
<td>( \infty )</td>
</tr>
<tr>
<td>( x \leq -1 )</td>
<td>( -\infty \leftarrow \infty )</td>
<td>( \infty )</td>
</tr>
<tr>
<td>( 8 \leq x &lt; 12 )</td>
<td>( -\infty \leftarrow \infty )</td>
<td>( \infty )</td>
</tr>
<tr>
<td>( x \leq -1 )</td>
<td>( -\infty \leftarrow \infty )</td>
<td>( (-\infty, \infty) )</td>
</tr>
<tr>
<td>( -\infty \leftarrow \infty )</td>
<td>( (-\infty, 6] )</td>
<td></td>
</tr>
<tr>
<td>( -\infty \leftarrow \infty )</td>
<td>( [1, 3] )</td>
<td></td>
</tr>
</tbody>
</table>
4. Solve the inequality, showing all steps. Write your answer as an inequality and in interval notation, then graph the solution set on the number line.

\[ 4x \leq 2x + 12 \]

Interval Notation: ________________

Graph:

\[ \infty \leftarrow \quad \infty \]

5. Solve the inequality, showing all steps. Write your answer as an inequality and in interval notation, then graph the solution set on the number line.

\[ 14m + 8 > 6m - 8 \]

Interval Notation: ________________

Graph:

\[ \infty \leftarrow \quad \infty \]

6. Solve the inequality, showing all steps. Write your answer as an inequality and in interval notation, then graph the solution set on the number line.

\[ 5(-2a - 8) \leq -9a + 4 \]

Interval Notation: ________________

Graph:

\[ \infty \leftarrow \quad \infty \]
7. Solve the inequality, showing all steps. Write your answer as an inequality and in interval notation, then graph the solution set on the number line.

\[-2d > 2 - (4 - 2d) + d\]

Interval Notation: 

Graph:

\[-\infty \quad \infty\]

8. Solve the equation \(|x| = 11\)

9. Solve the equation \(|x| = -11\)

10. Given values: \(x = 0\) \(x = -1\) \(x = -5\) \(x = -7\) \(x = 3\) \(x = 5\) \(x = 9\)

    a. Which of the given values are in the solution set for \(|x| < 5\) ?

    b. Which of the given values are in the solution set for \(|x| \geq 5\) ?

11. Graph the solution set for the inequalities shown below.

    a. \(|x| < 1\)

    b. \(|x| \geq 4\)
12. The area of a triangle is given by the formula \( A = \frac{1}{2}bh \). Solve this equation for \( h \). Show your work. Simplify your answer.

13. The volume of a cylinder is given by the formula \( V = \pi r^2 h \). Solve this equation for \( h \). Show your work. Simplify your answer.

14. The Surface area of a cylinder is given by the formula \( S = 2\pi rh + 2\pi r^2 \). Solve this equation for \( h \). Show your work. Simplify your answer.

15. Relative change is given by the formula \( R = \frac{N - C}{C} \). Solve for \( N \). Show your work. Simplify your answer.
16. Translate each of the given statements into an algebraic inequality.

a. A PG-13 movie rating means that your age, $a$, must be at least 13 years for you to view the movie.

b. The cost, $C_A$, of renting a car from company A is less expensive than the cost, $C_B$, of renting from company B.

c. The sum of the length, $L$, the width, $W$, and depth, $D$, of a piece of luggage to be checked on a commercial airline cannot exceed 61 inches without incurring an additional charge.

17. You have $1200 for your trip to the beach. You estimate that it will cost $160 a day for food, entertainment and hotel, plus $230 round trip air fair.

a. Write an inequality that can be used to determine the maximum number of days you can stay at the beach. Clearly indicate with each variable represents.

b. Solve the inequality, and interpret your answer in a complete sentence.
18. Let $p$ represent the marked price of an item at Toys R Us. Bella’s aunt gave her a $20 gift card to Toys R Us for her birthday.
   a. If sales tax is currently 9%, set up an algebraic inequality to express how much she can spend using her gift card. Clearly indicate what each variable represents.

   b. Solve the inequality, and interpret your answer in a complete sentence.

19. Your car is worth $2000 at most. It is old. You find out that it needs repairs to pass inspection. The auto shop tells you that the parts cost a total of $520, and the labor cost is $68 per hour. If the repairs are more than the car is worth, you are going to donate the car to charity.
   a. Write an inequality that can be used to determine the maximum number of hours the mechanic can spend working on your car to help you decide to repair it or donate it. Clearly indicate what each variable represents.

   b. Solve the inequality, and interpret your answer in a complete sentence.
20. CONVERSION FORMULAS:
   Complete the table below. Show your work. Simplify your answers.

<table>
<thead>
<tr>
<th>Conversion</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Celsius to Fahrenheit</td>
<td>$F = \frac{9}{5}C + 32$</td>
</tr>
<tr>
<td>Fahrenheit to Celsius</td>
<td></td>
</tr>
<tr>
<td>Celsius to Kelvin</td>
<td>$K = C + 273.15$</td>
</tr>
<tr>
<td>Kelvin to Celsius</td>
<td></td>
</tr>
<tr>
<td>Kelvin to Fahrenheit</td>
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