2.2 Solving Inequalities Using Addition or Subtraction
For use with Exploration 2.2

Essential Question  How can you use addition or subtraction to solve an inequality?

EXPLORATION: Quarterback Passing Efficiency

Work with a partner. The National Collegiate Athletic Association (NCAA) uses the following formula to rank the passing efficiencies $P$ of quarterbacks.

$$P = \frac{8.4Y + 100C + 330T - 200N}{A}$$

$Y =$ total length of all completed passes (in Yards)  $C =$ Completed passes  $T =$ passes resulting in a Touchdown  $N =$ Intercepted passes  $A =$ Attempted passes  $M =$ Incomplete passes

Determine whether each inequality must be true. Explain your reasoning.

a.  $T < C$

b.  $C + N \leq A$

c.  $N < A$

d.  $A - C \geq M$
2.2 Solving Inequalities Using Addition or Subtraction (continued)

2 EXPLORATION: Finding Solutions of Inequalities

Work with a partner. Use the passing efficiency formula to create a passing record that makes each inequality true. Record your results in the table. Then describe the values of \( P \) that make each inequality true.

<table>
<thead>
<tr>
<th>Attempts</th>
<th>Completions</th>
<th>Yards</th>
<th>Touchdowns</th>
<th>Interceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. \( P < 0 \)

b. \( P + 100 \geq 250 \)

c. \( P - 250 > -80 \)

Communicate Your Answer

3. How can you use addition or subtraction to solve an inequality?

4. Solve each inequality.
   a. \( x + 3 < 4 \)
   b. \( x - 3 \geq 5 \)
   c. \( 4 > x - 2 \)
   d. \( -2 \leq x + 1 \)
In your own words, write the meaning of each vocabulary term.

equivalent inequalities

Notes:

Core Concepts

Addition Property of Inequality

Words Adding the same number to each side of an inequality produces an equivalent inequality.

Numbers

\[
\begin{align*}
-3 &< 2 \\
1 &< 6 \\
-3 &\geq -10 \\
0 &\geq -7 \\
+4 &+ 4 \\
+3 &+ 3
\end{align*}
\]

Algebra

If \( a > b \), then \( a + c > b + c \).
If \( a \geq b \), then \( a + c \geq b + c \).
If \( a < b \), then \( a + c < b + c \).
If \( a \leq b \), then \( a + c \leq b + c \).

Notes:
2.2 Notetaking with Vocabulary (continued)

Subtraction Property of Inequality

Words  Subtracting the same number from each side of an inequality produces an equivalent inequality.

Numbers  

| Subtracting the same number from each side of an inequality produces an equivalent inequality. |
|---|---|---|---|
| $-3 \leq 1$ | $7 > -20$ |
| $-5 = -5$ | $-7 = -7$ |
| $-8 \leq -4$ | $0 > -27$ |

Algebra  

If $a > b$, then $a - c > b - c$.  
If $a \geq b$, then $a - c \geq b - c$.

If $a < b$, then $a - c < b - c$.  
If $a \leq b$, then $a - c \leq b - c$.

Notes:

Extra Practice

In Exercises 1–6, solve the inequality. Graph the solution.

1. $x - 3 < -4$

   
   
   
   
   

2. $-3 > -3 + h$

   
   
   
   
   

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2.2 Notetaking with Vocabulary (continued)

3. \( s - (-1) \geq 2 \)

4. \( 6 - 9 + u < -2 \)

5. \( 12 \leq 4c - 3c + 10 \)

6. \( 15 - 7p + 8p > 15 - 2 \)

7. You have $15 to spend on groceries. You have $12.25 worth of groceries already in your cart.
   
   a. Write an inequality that represents how much more money \( m \) you can spend on groceries.

   b. Solve the inequality.