You will study students’ solutions to algebra equations. Often, students solved the same problem in two different ways. You should:

1. Describe each student’s solution to your partner and finish labeling their steps.
2. Talk about the answers to the questions and then write your final answers.
3. Sometimes you will solve a problem using one of the student’s ways

At the end, you will solve some problems on your own.
These two students solved the **same problem in two different ways**.

<table>
<thead>
<tr>
<th>Sammy’s Solution:</th>
<th>James’ Solution:</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2(x - 3) = 8$</td>
<td>$2(x - 3) = 8$</td>
</tr>
<tr>
<td>$2x - 6 = 8$</td>
<td>$x - 3 = 4$</td>
</tr>
<tr>
<td>$2x = 14$</td>
<td>Divide 2 on Both</td>
</tr>
<tr>
<td>$x = 7$</td>
<td>$x = 7$</td>
</tr>
</tbody>
</table>

Complete the step labels for each solution in the blank spaces provided above.

1. How do you know if both ways to solve the problem are correct?

2. Sammy and James divided both sides by 2, but in different steps. Why is the divide step OK to do in either step?
These two students solved the **same problem in two different ways**.

<table>
<thead>
<tr>
<th>Jessica’s Solution:</th>
<th>Mary’s Solution:</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3(t - 1) + 3(t - 1) = 30$</td>
<td>$3(t - 1) + 3(t - 1) = 30$</td>
</tr>
<tr>
<td>$3t - 3 + 3t - 3 = 30$</td>
<td>$6(t - 1) = 30$</td>
</tr>
<tr>
<td>$6t - 6 = 30$</td>
<td>Combine $(t - 1)$’s</td>
</tr>
<tr>
<td>$6t = 36$</td>
<td>$t - 1 = 5$</td>
</tr>
<tr>
<td>$t = 6$</td>
<td>Divide __________ on Both</td>
</tr>
<tr>
<td>Add __________ on Both</td>
<td>$t = 6$</td>
</tr>
<tr>
<td>Divide __________ on Both</td>
<td>Add __________ on Both</td>
</tr>
</tbody>
</table>

Complete the step labels for each solution in the blank spaces provided above.

3. Describe 2 ways that these students’ **solutions** are **similar**.

   (1)

   (2)

4. To solve $4(y + 5) + 6(y + 4) + 5(y + 2) = 42$, whose first step would work better? **Circle one**: Jessica Mary

   **Explain your reasoning:**

   GP1: Working with your partner, solve the following equation using **Mary’s way**.

   $6(x + 4) + 5(x + 4) = 22$
SOLVE THESE PROBLEMS BY YOURSELF. You will solve each problem **two ways**. Be sure to show your work. Then, check your answers with a teacher.

24 = 4(x – 1)

**Way 1**

24 = 4(x – 1)

**Way 2**

24 = 4(x – 1)

9 = 3(x – 4) + 6(x – 4)

**Way 1**

9 = 3(x – 4) + 6(x – 4)

**Way 2**

9 = 3(x – 4) + 6(x – 4)
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<table>
<thead>
<tr>
<th>Nathan’s Solution:</th>
<th>Patrick’s Solution:</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ 5(y + 1) = 3(y + 1) + 8 ]</td>
<td>[ 5(y + 1) = 3(y + 1) + 8 ]</td>
</tr>
<tr>
<td>[ 5y + 5 = 3y + 3 + 8 ]</td>
<td>[ 2(y + 1) = 8 ]</td>
</tr>
<tr>
<td>[ 5y + 5 = 3y + 11 ]</td>
<td>[ \text{Subtract } 3(y + 1) \text{ on Both} ]</td>
</tr>
<tr>
<td>[ 2y + 5 = 11 ]</td>
<td>[ y + 1 = 4 ]</td>
</tr>
<tr>
<td>[ 2y = 6 ]</td>
<td>[ \text{Divide } _ _ _ _ _ _ _ _ on Both ]</td>
</tr>
<tr>
<td>[ y = 3 ]</td>
<td>[ y = 3 ]</td>
</tr>
</tbody>
</table>

Complete the step labels for each solution in the blank spaces provided above.

5. Describe 2 ways that these students’ solutions are different.
   (1)
   (2)

6. On a timed test, I would use ________________________’s way because:

GP2: Working with your partner, solve the following equation using Patrick’s way:
\[ 5(x + 2) = 3(x + 2) + 16 \]
These two students solved the **same problem in two different ways**.

<table>
<thead>
<tr>
<th>Abby’s Solution:</th>
<th>Heather’s Solution:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3(h - 2) + 5(h - 2) = 24)</td>
<td>(3(h - 2) + 5(h - 2) = 24)</td>
</tr>
<tr>
<td>(8(h - 2) = 24)</td>
<td>(3h - 6 + 5h - 10 = 24)</td>
</tr>
<tr>
<td>(h - 2 = 3)</td>
<td>(8h - 16 = 24)</td>
</tr>
<tr>
<td>(h = 5)</td>
<td>(8h = 40)</td>
</tr>
<tr>
<td>(h = 5)</td>
<td>(h = 5)</td>
</tr>
</tbody>
</table>

Complete the step labels for each solution in the blank spaces provided above.

7. Why might you choose Abby’s way to solve this problem?

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8. What must be true about an equation for Abby’s way to be easier than Heather’s way?
SOLVE THESE PROBLEMS BY YOURSELF. You will solve each problem **two ways**. Be sure to show your work. Then, check your answers with a teacher.

$$9 + 5(x + 1) = 8(x + 1)$$

**Way 1**

$$9 + 5(x + 1) = 8(x + 1)$$

**Way 2**

$$9 + 5(x + 1) = 8(x + 1)$$

$$2(y + 6) + 3(y + 6) = 25$$

**Way 1**

$$2(y + 6) + 3(y + 6) = 25$$

**Way 2**

$$2(y + 6) + 3(y + 6) = 25$$
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**Todd’s Solution:**
\[
\frac{3}{4}(x + 8) = 15 \\
\frac{3}{4}x + 6 = 15 \\
\frac{3}{4}x = 9 \\
x = 12
\]

**Matthew’s Solution:**
\[
\frac{3}{4}(x + 8) = 15 \\
x + 8 = 20 \\
x = 12
\]

Complete the step labels for each solution in the blank spaces provided above.

9. Matthew’s way is easier than Todd’s way when:

10. Describe 2 ways these students’ solutions are similar:
   (1)
   (2)

GP3: Working with your partner, solve the following equation using Matthew’s way:
\[
\frac{2}{5}(x - 4) = 2
\]
These two students solved the same problem in two different ways.

<table>
<thead>
<tr>
<th>Brianna’s Solution:</th>
<th>Caitlyn’s Solution:</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3(n - 2) + 12 = 6(n - 2)$</td>
<td>$3(n - 2) + 12 = 6(n - 2)$</td>
</tr>
<tr>
<td>$12 = 3(n - 2)$ Subtract _________</td>
<td></td>
</tr>
<tr>
<td>$4 = n - 2$ Divide _______ on Both</td>
<td></td>
</tr>
<tr>
<td>$6 = n$ Add _______ on Both</td>
<td></td>
</tr>
<tr>
<td>$3n + 6 = 6n - 12$</td>
<td></td>
</tr>
<tr>
<td>$6 = 3n - 12$ Subtract _______ on Both</td>
<td></td>
</tr>
<tr>
<td>$18 = 3n$ Add _______ on Both</td>
<td></td>
</tr>
<tr>
<td>$6 = n$ Divide _______ on Both</td>
<td></td>
</tr>
</tbody>
</table>

Complete the step labels for each solution in the blank spaces provided above.

11. __________________________’s way is better on this problem because:

12. If the problem were $8(j + 2) = 4(j + 8) + 12$, whose first step would work better? **Circle one:** Brianna Caitlyn

Explain your reasoning:
SOLVE THESE PROBLEMS BY YOURSELF. You will solve each problem two ways. Be sure to show your work. Then, check your answers with a teacher.

\[
\frac{1}{6}(x + 1) = 1
\]

Way 1

\[
\frac{1}{6}(x + 1) = 1
\]

Way 2

\[
\frac{1}{6}(x + 1) = 1
\]

\[
4(x - 3) = 2(x - 3) + 10
\]

Way 1

\[
4(x - 3) = 2(x - 3) + 10
\]

Way 2

\[
4(x - 3) = 2(x - 3) + 10
\]