CSM Day 1

Your Name______________________________

Partner’s Name__________________________

- You will study students’ solutions to algebra equations. 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.

- Sometimes, you will solve some problems on your own.
These two students solved the same problem in two different ways. Complete the step labels in the blank spaces provided below.

<table>
<thead>
<tr>
<th>Alex’s distribute-first way:</th>
<th>Morgan’s multiply/divide-first way:</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>$x = 7$</td>
</tr>
<tr>
<td>$x = 7$</td>
<td>Added _________ on Both</td>
</tr>
<tr>
<td>Divided by _________ on Both</td>
<td>Divided by 2 on Both</td>
</tr>
</tbody>
</table>

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

2. Alex and Morgan divided both sides by 2, but in different steps. Why is the divide step OK to do in either step?

GP1. To solve $6(x - 2) = 18$, do you want to use Alex’s distribute-first way or Morgan’s multiply/divide-first way?

**Circle One:** Alex  Morgan  

Now, solve it using your chosen way.

$6(x - 2) = 18$
3. On a timed test, I would use ________________________’s way because:

4. Describe 2 ways these students' solution steps are similar:

   (1) 

   (2)
SOLVE THESE PROBLEMS BY YOURSELF. Be sure to show your work. Next, check your answers with your partner. Last, raise your hand so a teacher can check your work.

\[ 24 = 4(x - 1) \]
\[ 5(x + 3) = 60 \]
CSM Day 1

<table>
<thead>
<tr>
<th>Alex’s <strong>distribute-first</strong> way:</th>
<th>Morgan’s <strong>multiply/divide-first</strong> way:</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{1}{4}(x + 8) = 5$</td>
<td>$\frac{1}{4}(x + 8) = 5$</td>
</tr>
<tr>
<td>$\frac{1}{4}x + 2 = 5$</td>
<td>$x + 8 = 20$</td>
</tr>
<tr>
<td><strong>Distributed</strong> ___________</td>
<td>Multiplied by 4, the reciprocal of $\frac{1}{4}$ on Both</td>
</tr>
<tr>
<td>$\frac{1}{4}x = 3$</td>
<td>$x = 12$</td>
</tr>
<tr>
<td><strong>Subtracted</strong> ___________ on Both</td>
<td><strong>Subtracted</strong> ___________ on Both</td>
</tr>
<tr>
<td>$x = 12$</td>
<td></td>
</tr>
<tr>
<td><em>Multiplied by 4, the reciprocal of $\frac{1}{4}$ on Both</em></td>
<td></td>
</tr>
</tbody>
</table>

5. ____________________________’s way is better on this problem because:

6. Why might you choose Morgan’s way to solve this problem?
7. Describe 2 ways these students' solution steps are different:

(1)

(2)

8. To solve $4(y + 5) + 6(y + 4) = 42$, whose first step would work best? **Circle One:** Alex’s Morgan’s

Explain your reasoning:

GP2. To solve $4(h + 2) + 3(h + 2) = 70$, do you want to use Alex’s **distribute-first** way or Morgan’s **combine-then-divide** way?

**Circle One:** Alex Morgan

Now, solve it using your chosen way.

$4(h + 2) + 3(h + 2) = 70$
SOLVE THESE PROBLEMS BY YOURSELF. Be sure to show your work. 
Next, check your answers with your partner. Last, raise your hand so a teacher can check your work.

\[
\begin{align*}
10 &= 2(x - 3) \\
12 &= 2(x - 4) + 2(x - 4) \\
7(x + 1) + 3(x + 1) &= 40 \\
6(f + 5) &= 120
\end{align*}
\]
PLEASE STOP HERE AND WAIT UNTIL DAY 2

Fill this part out tomorrow:

Do you have the same partner as yesterday? Please circle one. YES or NO.

If not, please write your new partner’s name here: ________________________________
These two students solved the same problem in two different ways. Complete the step labels in the blank spaces provided below.

<table>
<thead>
<tr>
<th>Alex’s distribute-first way:</th>
<th>Morgan’s multiply/divide-first way:</th>
</tr>
</thead>
<tbody>
<tr>
<td>$7(x - 2) = 21$</td>
<td>$7(x - 2) = 21$</td>
</tr>
<tr>
<td>$7x - 14 = 21$</td>
<td>$x - 2 = 3$</td>
</tr>
<tr>
<td>Distributed _______</td>
<td>Divided by _______ on Both</td>
</tr>
<tr>
<td>$7x = 35$</td>
<td>$x = 5$</td>
</tr>
<tr>
<td>Added _______ on Both</td>
<td>Added _______ on Both</td>
</tr>
<tr>
<td>$x = 5$</td>
<td>Divided by _______ on Both</td>
</tr>
</tbody>
</table>

9. Alex and Morgan divided both sides by 7, but in different steps. Why is the divide step OK to do in either step?

10. _________________________ ’s way is better on this problem because:

GP3. To solve $5(x + 3) = 25$, do you want to use Alex’s distribute-first way or Morgan’s multiply/divide-first way?

**Circle One:** Alex Morgan

Now, solve it using your chosen way.

$5(x + 3) = 25$
11. Describe 2 ways that these two students’ solution steps are different.

(1)

(2)

12. On a timed test, I would rather use ________________________’s way because:
Morgan’s **multiply/divide-first** way:

\[
\frac{1}{2}(b + 4) = 6 \\
b + 4 = 12 \quad \text{Multiplied by } \text{__________ on Both} \\
b = 8 \quad \text{Subtracted } \text{__________ on Both}
\]

Alex’s **distribute-first** way:

\[
\frac{1}{2}(b + 4) = 6 \\
\frac{1}{2}b + 2 = 6 \quad \text{Distributed } \text{__________} \\
\frac{1}{2}b = 4 \quad \text{Subtracted } \text{__________ on Both} \\
b = 8 \quad \text{Multiplied by } \text{__________ on Both}
\]

13. Both students multiplied by the reciprocal of \(\frac{1}{2}\), which is 2. You could also say they divided both sides by \(\frac{1}{2}\). **Explain why:**

14. Describe 2 ways that these two students’ solution steps are similar.

(1)

(2)

GP4. To solve \(\frac{1}{3}(x - 6) = 4\), do you want to use Morgan’s **multiply/divide-first** way or Alex’s **distribute-first** way?

**Circle One:** Morgan Alex

Now, solve it using your chosen way.

\[
\frac{1}{3}(x - 6) = 4
\]
SOLVE THESE PROBLEMS BY YOURSELF. Be sure to show your work.
Next, check your answers with your partner. Last, raise your hand so a teacher can check your work.

\[
\frac{1}{6}(x + 6) = 2 \quad \quad \quad 4 = 2(n + 5)
\]
Alex’s **distribute-first** way:

\[
\begin{align*}
2(m + 7) + 4(m + 7) &= 18 \\
2m + 14 + 4m + 28 &= 18 \\
6m + 42 &= 18
\end{align*}
\]

Distributed _________

\[
\begin{align*}
6m &= -24 \\
m &= -4
\end{align*}
\]

Combined _________

Subtracted _________ on Both

Divided by _________ on Both

Morgan’s **combine-then-divide** way:

\[
\begin{align*}
2(m + 7) + 4(m + 7) &= 18 \\
6(m + 7) &= 18
\end{align*}
\]

Combined _________

\[
\begin{align*}
m + 7 &= 3 \\
m &= 3 - 7 \\
m &= -4
\end{align*}
\]

Divided by _________

Subtracted _________ on Both

15. Describe one way that these students’ **solution steps** are the same, and one way they are different.

**Same:**

**Different:**

16. What must be true about an equation for Morgan’s way to be easier than Alex’s way?

GP5. To solve \(3(y + 5) + 2(y + 5) = 55\), do you want to use Alex’s **distribute-first** way or Morgan’s **combine-then-divide** way?

**Circle One:** Alex Morgan

Now, solve it using your chosen way.

\[
3(y + 5) + 2(y + 5) = 55
\]
### Morgan’s combine-then-divide way:

\[
\begin{align*}
24 &= 3(h - 2) + 5(h - 2) \\
24 &= 8(h - 2) \\
3 &= h - 2 \\
5 &= h
\end{align*}
\]

Combined ________ on Both

Divided by ________ on Both

Added ________ on Both

### Alex’s distribute-first way:

\[
\begin{align*}
24 &= 3(h - 2) + 5(h - 2) \\
24 &= 3h - 6 + 5h - 10 \\
24 &= 8h - 16 \\
40 &= 8h \\
5 &= h
\end{align*}
\]

Distributed ________

Combined ________

Added ________ on Both

Divided by ________ on Both

17. Why might you choose Morgan’s way to solve this problem?

18. If the problem was \(8(j + 2) + 4(j + 8) = 12\), you could not use Morgan’s way. **Explain why:**
SOLVE THESE PROBLEMS BY YOURSELF. Be sure to show your work. Next, check your answers with your partner. Last, raise your hand so a teacher can check your work.

\[
\begin{align*}
\frac{1}{5}(x + 15) &= 1 \\
5(y + 8) &= 30 \\
2(y + 6) + 3(y + 6) &= 25 \\
5(b - 3) + 2(b - 3) &= 35
\end{align*}
\]