Module #2: Combining Like Terms & Distributive Property
Worksheet 6c: Combining Like Terms & Distributive Property

Objective: Recognize and combine like terms and be able to distribute terms over addition or subtraction.

Combining Like Terms

Terms are called “like terms” if they have the same variable and can be combined:

<table>
<thead>
<tr>
<th>Like Terms</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x + 3x</td>
<td>5x</td>
</tr>
<tr>
<td>-6t + 4t</td>
<td>-2t</td>
</tr>
<tr>
<td>0.5m + 4.5m</td>
<td>5.0m</td>
</tr>
<tr>
<td>-3x + -5x + 10x</td>
<td>x</td>
</tr>
<tr>
<td>5x – 3</td>
<td>5x - 3   (They are not “like” terms, no “x” on 3)</td>
</tr>
</tbody>
</table>

Combining Like Terms to Solve Equations

Solving Equations

You order 5 plain bagels and 8 onion bagels. Each bagel is the same price. With a loaf of bread, which costs $1.50, the total bill is $8.00. Solve the equation 5b + 8b + 1.50 = 8.00 to find the cost of one bagel. b represents the cost of one bagel.

\[
\begin{align*}
\text{Left} & \quad \text{Right} \\
5b + 8b + 1.50 & \quad = 8.00 \\
\text{Combine like terms} & \quad \text{Subtract 1.50 from each side} \\
13b + 1.50 & \quad = 6.50 \\
-1.50 & \quad -1.50 \\
13b & \quad = 6.50 \\
\frac{13b}{13} & \quad \frac{6.50}{13} \\
b & \quad = 0.50 \\
\end{align*}
\]

Each bagel costs $.50.

Simplify by combining terms, if possible:

1. \(-b + 15b\)  
2. \(5x – 12x\)  
3. \(-8 + (-5a)\)  
4. \(7y – (-y)\)  
5. \(-3a – (-7a)\)  
6. \(-8n – (-8n)\)
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Solve by combining “like” terms first, then check each equation:

7. \( n + 4n - 11 = 19 \)  
8. \( 9 - y + 6y = -6 \)  
9. \( 60 - 12b + 12 = 0 \)

10. \( g + 8g - 5 = -1 \)  
11. \( 6x + 7.2 - x = 2.4 \)  
12. \( 2c + 7.5c = 57 \)

13. \( a + a + 5 + a + 3 = -1.24 \)  
14. \( x + 2x + 3x - 7 = -25 \)

Write an equation and then solve each problem:

15. A printer wants to center a 6-inch wide column of text on a page that is 8.5-inch wide. If the margins on the two sides are even, how wide should each margin be?
Write an equation and then solve each problem:

16. Tapes and discs are on sale for the same price. You buy 4 tapes and 2 discs. You also buy a video that costs $16. The total bill is $82. How much does each tape cost?

17. The ages of four cousins are consecutive integers. Let the integers equal n, n + 1, n + 2, and n + 3. The sum of their ages is 26. How old is each of the cousins?

18. The perimeters of a square and an equilateral triangle add up to 77 cm. Both figures have sides of the same length. How long is each side?
Using the Distributive Property

Distributing involves multiplying:

\[ 2(3x + 4) = 6x + 4 \]

\[ -3(5t + 7) = -15t + -21 \text{ (or: } -15t – 21) \]

Remember:

\[ 6 - (-10m – 5) = 6 + 10m + 5 \]

There is a -1 in front of the ( ).

Using the Distributive Property to Solve Equations

You have purchased a total of ten compact discs and cassette tapes. The bill is $111. The discs cost $12 each and the tapes cost $9 each. How many of each type did you purchase?

Let \( n \) = number of $12 discs

Let \( 10 – n \) = number of $9 tapes

\[ \text{total cost of discs} + \text{total cost of tapes} = \text{total bill} \]

\[ 12n + 9(10 – n) = 111 \]

Use the distributive property.

Combine like terms.

\[ 12n + 90 – 9n = 111 \]

\[ 3n + 90 = 111 \]

\[ 3n = 21 \]

\[ \frac{3n}{3} = \frac{21}{3} \]

\[ n = 7 \]

(Remember: \( n \) = # of discs, \( 10 – n \) = tapes)

You purchased 7 discs and 3 tapes.
Simplify by distributing:

19. \(2(x + 3)\)  

20. \(-5 (2a - 3)\)

21. \(-(4x - 10)\)  

22. \(-7 (-2a - 5)\)

23. \(10(-8x + 5)\)  

24. \(-6 (-4a - 1)\)

Simplify by distributing and then combining “like” terms:

25. \(x + 5(x - 1)\)  

26. \(8a - (2a - 3)\)

27. \(6(y + 4) - 2y\)  

28. \(-3(2r - 1) + r\)
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Solve and check each equation:

29. 2(a + 7) = 16
30. -5(b + 2) = 30

31. 2(c - 3) - c = 9
32. 2(d + 3) + d = 12

33. -2(3 - 2g) + 4g = 10
34. 23 = 12 - (6 + k)

Write an equation and solve each problem:

35. A table top is rectangular. The table’s length is 60 cm more than its width. The perimeter of the table is 240 cm. Find the length and width of the table.

36. Bill bought 10 lbs of peanuts and cashews for his party. The cashews cost $7/lb and the peanuts $3/lb. Bill spent a total of $50. How many pounds of each did he buy?