

Name _____ Date _____

Notes Combining Like Terms

One way to simplify an expression is to "combine like terms."

What does it mean to combine like terms?	
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You can only combine terms that have the same _____ and the same _____.

<i>To combine like terms, first use the commutative property to move all like terms together. Then, combine the coefficients of the variables.</i>		
<p style="text-align: center;"><i>Example 1:</i></p> $\begin{array}{c} \boxed{2a} + \boxed{3b} - \boxed{4a} \\ \downarrow \quad \downarrow \quad \downarrow \\ 2a - 4a + 3b \\ \downarrow \quad \downarrow \\ -2a + 3b \end{array}$	<div style="border: 1px solid black; padding: 5px; margin: 5px auto; width: fit-content;"> <p style="text-align: center;">Note: Make sure to move any negative signs with the term it is before!</p> </div> <p style="text-align: center;"><i>Example 1:</i></p> $\boxed{14m} - \boxed{3n^2} - \boxed{2n^2} + \boxed{3m}$	<p style="text-align: center;"><i>Example 1:</i></p> $5x + 4x - 6 + 5x^2$

Note: all of your answers should be arranged so that the variables are in _____ order first, then in order from greatest to least _____.

Watch out for the following common mistakes! Circle the mistakes below:		
<p style="text-align: center;"><i>Mistake #1:</i></p> $\boxed{a^2} - 4a + \boxed{5a}$ $2a^2$ <p style="text-align: center;">You can ONLY combine terms when the variable has the same exponent.</p>	<p style="text-align: center;"><i>Mistake #2:</i></p> $\begin{array}{c} \boxed{3y} + \boxed{4x^2} - \boxed{3y} + \boxed{5y} \\ \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \\ 3y - y + 5y + 4x^2 \\ \downarrow \quad \downarrow \\ 7y + 4x^2 \end{array}$ <p style="text-align: center;">You should ALWAYS put the variables of your answer in alphabetical order, then in order by exponent.</p>	<p style="text-align: center;"><i>Mistake #3:</i></p> $\begin{array}{c} \boxed{3h} + \boxed{14g} - \boxed{5h} + \boxed{5g} \\ \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \\ 3h + 5h + 14g - 5g \\ \downarrow \quad \downarrow \\ 8h + 9g \\ \downarrow \quad \downarrow \\ 9g + 8h \end{array}$ <p style="text-align: center;">You should ALWAYS move the negative sign along with the term that is after it.</p>

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Practice Combining Like Terms

Which terms are like terms? (Not all terms will be used.)

<i>Write all terms that can be combined with $3a$.</i>	<i>Write all terms that can be combined with $4b$.</i>	<i>Write all terms that can be combined with a^2.</i>	<i>Write all terms that can be combined with 5.</i>
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1. $14a$

2. $5ab$

3. $3b$

4. $3a^2$

5. $4b^2$

6. 17

7. 100

8. $14ab$

9. $5a^3$

10. $4a$

11. $16b$

12. $73a^2$

Simplify the following expressions by combining like terms. Show all work on a separate sheet of paper and box your answer.

13. $4x - 6x$

14. $7y + 5y - 5y$

15. $4r + 4y - 8$

16. $3m + 4n - 6n$

17. $4g + 6g - 3g$

18. $15f - 5 + 2f$

19. $13x - 7y + 4x$

20. $5x^2 - 4x + 9x^2$

21. $4b + 7a - 8$

22. $13r + 5s - 2r$

23. $a + a + 3b + b$

24. $3y - 4y^2 + 3y$

25. $(3a - b) + 2a$

26. $2w + 4w^2 - 5w^3$

27. $c^3 + 4c - 4c^3$

28. $a - 3b + 5c + 4a$

29. $2x + 7x - 6x + 8$

30. $11q + 5p - 9q + 7p$

31. $3mn + 4m - 2mn$

32. $0t - 9t + 6u + 4u^5$

33. $11d + 5f - 21d + 5 - 8$

34. $12 + 9x - 6x - 19$

35. $y^2 + 3y^2 - 6y + 4y^2$

36. $2 - 5t + 8 + 5t - 8$

Bonus: Simplify the expression below by combining like terms.

$$4z + x - 5x + 7y - 3x + 5y^2 - 3z + 16z + 14x - 5$$

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Practice Combining Like Terms Puzzle

Simplify each expression by combining like terms. Find the answer at the bottom of the page. Then write the letter on the appropriate line below to spell out a secret message. (Some letters may be used more than once!)

Did you hear the one about the acupuncture?

$\frac{\quad}{1}$ $\frac{\quad}{2}$ $\frac{\quad}{3}$ $\frac{\quad}{4}$ $\frac{\quad}{5}$ $\frac{\quad}{6}$ $\frac{\quad}{7}$ $\frac{\quad}{8}$ $\frac{\quad}{9}$
 $\frac{\quad}{10}$ $\frac{\quad}{11}$ $\frac{\quad}{12}$ $\frac{\quad}{13}$ $\frac{\quad}{14}$ $\frac{\quad}{15}$ $\frac{\quad}{16}$ $\frac{\quad}{17}$!

1. $2m + 3m^2 - 4m$	2. $2x + x - 4y$	3. $2m + 4m - 3m^2$	4. $2y + 14x - 7x + 9y$
5. $8n - 4n^2 + 8n$	6. $11g - 9g + 8g$	7. $3m^2 - 2m + 4m$	8. $20 + 10q + 3q - 4$
9. $4xy + x + 2xy$	10. $6m^2 + 6m - 9m^2$	11. $3n - 6mn + 2n$	12. $\frac{3}{2}x - y + \frac{1}{2}x + 3y$
13. $y + x + y + x$	14. $8n + 4n^2 - 8n$	15. $5 + 5mn - 11mn$	16. $15y + 6y - 3x + xy$
17. $3xy - 5xy + 21y$			

I. $3m^2 - 2m$ S. $-4n^2 + 16n$ E. $-2xy + 21y$ O. $-6mn + 5$ T. $3x - 4y$	N. $-3x + xy + 21y$ W. $-3m^2 + 6m$ J. $3m^2 + 2m$ B. $x + 6xy$ A. $10g$	A. $7x + 11y$ E. $-6mn + 5n$ A. $13q + 16$ L. $2x + 2y$ D. $4n^2$
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Enrichment Activity 1 Combining Like Terms

Have you ever heard the phrase "you can't compare apples and oranges?" Place each of the terms below on the proper "tree" that contains like terms. (Not all terms belong on a tree!)

x^2	11	4z	xy	y
9y	2z	$2y^3$	5z	11y
9x	$6x^2$	9y	2z	19
7	$-x^2$	3y	2x	7z

The worksheet includes four trees for classification:

- Tree 1 (Left):** Labeled with y at the base. It has five empty boxes in its canopy.
- Tree 2 (Right):** Labeled with x^2 at the base. It has three empty boxes in its canopy.
- Tree 3 (Bottom Left):** Labeled with 8 at the base. It has three empty boxes in its canopy.
- Tree 4 (Bottom Right):** Labeled with z at the base. It has four empty boxes in its canopy.

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Enrichment Activity 2
Combining Like Terms Group Cards

Teacher Notes: Use these cards to put students into groups for class work or other activities. (It can also be used as an anticipatory set for a unit.) All students with like terms should find each other to form groups.

$2a$	$4a$	$-3a$	$-7a$
$4b$	$9b$	$-4b$	b
$3ab$	$4ab$	$9ab$	$-2ab$
$4a^2$	$-2a^2$	$-a^2$	$-18a^2$
$3b^2$	$-7b^2$	$-b^2$	$9b^2$
$10c$	$11c$	$-5c$	$-c$
$7c^2$	$-4c^2$	$8c^2$	$-12c^2$
ac	$3ac$	$6ac$	$-2ac$
$6bc$	$9bc$	$10bc$	$-3bc$