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?	

You can only combine terms that have the same _____ and the same

_____.

*To combine like terms, **first** use the commutative property to move all like terms together. **Then**, combine the coefficients of the variables.*

Example 1:

$2a + 3b - 4a$

$2a - 4a + 3b$

$-2a + 3b$

Note: Make sure to move any negative signs with the term it is before!

Example 1:

$14m - 3n^2 - 2n^2 + 3m$

Example 1:

$5x + 4x - 6 + 5x^2$

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:

Mistake #1:

$a^2 - 4a + 5a$

$2a^2$

*You can **ONLY** combine terms when the variable has the same exponent.*

Mistake #2:

$3y + 4x^2 - 3y + 5y$

$3y - y + 5y + 4x^2$

$7y + 4x^2$

*You should **ALWAYS** put the variables of your answer in alphabetical order, then in order by exponent.*

Mistake #3:

$3h + 14g - 5h + 5g$

$3h + 5h + 14g - 5g$

$8h + 9g$

$9g + 8h$

*You should **ALWAYS** move the negative sign along with the term that is after it.*

Learning Activity:
Combining Like Terms Cards

Cut out the pieces along the dotted lines. Each row is a separate expression. Use these cards on a board or projector to physically move the terms so that like terms are together. This, along with color coding like terms, can help struggling students to see what you are doing when you combine like terms. (This activity can be easily extended by giving each student an index card and asking them to write a term using the variables a, b, or a constant. For example, a student might come up with 3a, 11b or 8. Then choose student cards at random from the room to put together into an expression and solve.)

1	$4a^2$	$+ 3a$	$- 16a$	$+ a^2$
2	$6b$	$- 7b$	$+ 8$	$+ 4b$
3	11	$- 19$	$+ 8g$	$- 6g$
4	$5g^2$	$+ 6g$	$- 4g$	$+ 8g^5$
5	$17x$	$- 6y$	$+ 9y^3$	$- 8x$
6	$6y$	$+ 8$	$- 6y$	$- 8$
7	$-6d$	$+ 5c$	$- 4c^2$	$+ 3c$
8	$2a$	$+ 8$	$- a$	$+ 4a$
9	$2x^2$	$+ 5x^3$	$- 6x^2$	$+ x^4$
10	$4p$	$+ 3np$	$- 3n$	$+ 2p$

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Practice

Combining Like Terms

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

Circle all terms that can be combined with 3a.	*Draw a square around all terms that can be combined with 4b.*	*Underline all terms that can be combined with a^2.*	*Draw an X through all terms that can be combined with 5.*

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. $2 – 5t + 8 + 5t – 8$

When part of an expression is over or under a division bar, you must act as if that part of the expression is inside of parenthesis. Use PEMDAS to decide if you can simplify the expression any further. (Think: did you get a fraction that you can simplify?)

37. $\dfrac{14r + 12s}{4s – 10s}$
38. $\dfrac{3x^2}{12 – 14x^2}$
39. $\dfrac{2 – 5t}{2 + 5t – 4t}$
40. $\dfrac{2x – 6y + 4x}{3y – 8 + y}$
41. $\dfrac{11d + 9d}{8d – 3d}$
42. $\dfrac{12x – 7x}{5x}$

Bonus: Simplify the expression below by combining like terms.

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

Name _____ Date _____

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?

_____	_____		_____	_____	_____		_____		_____	_____	_____						
1	*2*		*3*	*4*	*5*		*6*		*7*	*8*	*9*						
_____	_____	_____	_____		_____	_____	_____	_____	*!*								
10	*11*	*12*	*13*		*14*	*15*	*16*	*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. $^3/_2x – y + ½x + 3y$
13. $y + x + y + x$	14. $8n + 4n^2 – 8n$	15. $5 + 5mn – 11mn$	16. $15y + 6y – 3x + xy$
17. $3xy – 5xy + 21y$			

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

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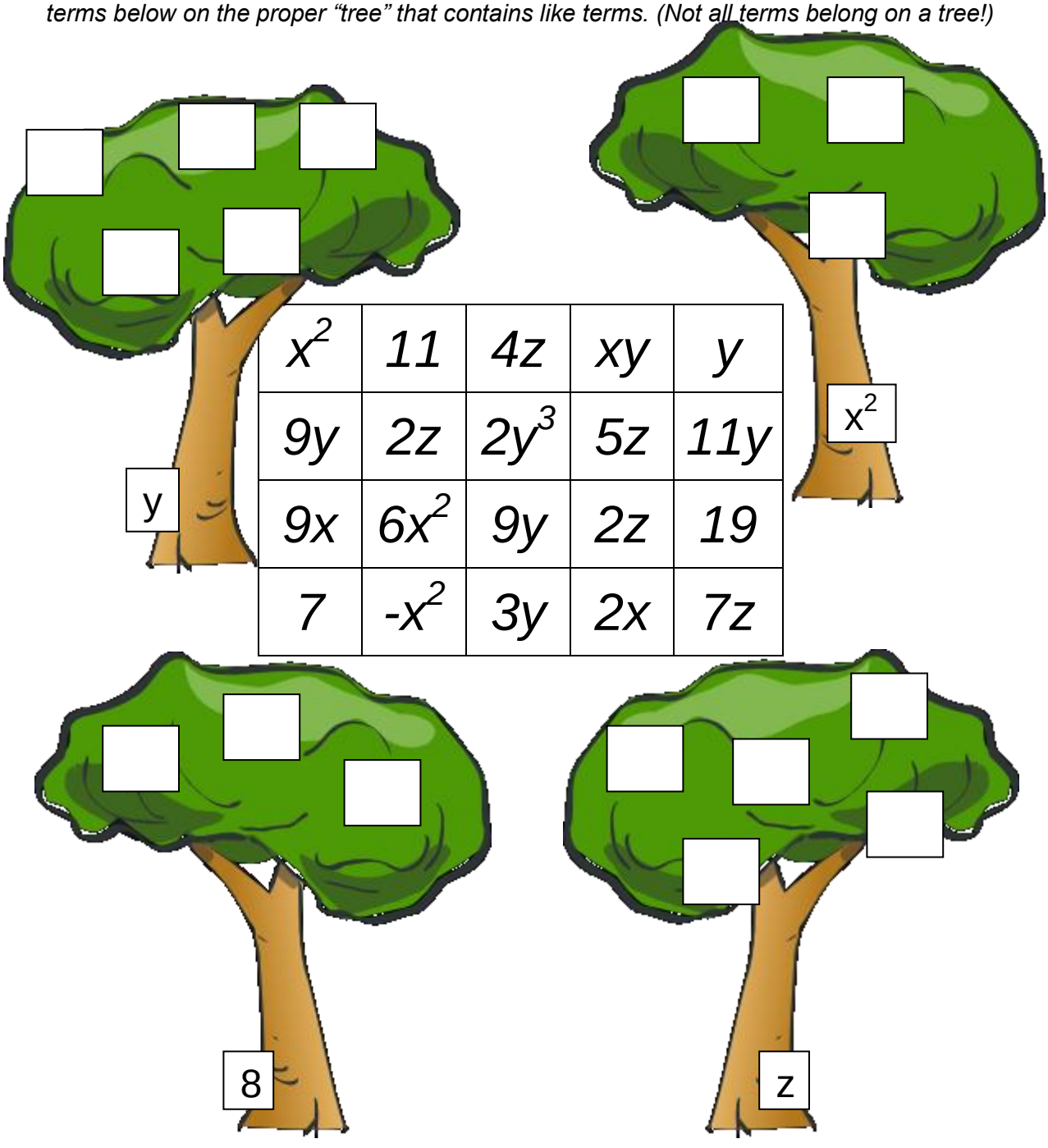
Enrichment Activity 1

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	$-x^2$	$3y$	$2x$	$7z$

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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	$3ac$	$6ac$	$-2ac$
$6bc$	$9bc$	$10bc$	$-3bc$