Collecting Like Terms, Distributive Property and Solving Equations Oh My...

The terms of an expression are the parts to be added or subtracted. Like terms are terms that contain the same variables raised to the same powers. Constants are also like terms.

A coefficient is a number multiplied by a variable. Like terms can have different coefficients. A variable written without a coefficient has a coefficient of 1.

<table>
<thead>
<tr>
<th>Like Terms</th>
<th>Not Like Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>$4x^2, 7x^2$</td>
<td>$3m, 5m^3$</td>
</tr>
<tr>
<td>$12y, 18y$</td>
<td>$12y, 12xy$</td>
</tr>
<tr>
<td>$5ab^2, -ab^2$</td>
<td>$st^4, 3s^4t$</td>
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</tbody>
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Terms can be combined only if they are like terms. Like terms can have different coefficients, but they must have the same variables raised to the same powers.

Simplify the expressions below by combining like terms.

(a) $3x - 7y + 4x - 7y$  
(b) $8 + x^2 - 11$  
(c) $5a + 7b - 9a - 2$

Using the Distributive Property can help you combine like terms. Notice that you can combine like terms by adding or subtracting the coefficients and keeping the variables and exponents the same.

Simplify $4(x + y) + 5x - 9$.

$4x + 4y + 5x - 9$  
$4x + 5x + 4y - 9$  
$9x + 4y - 9$  
$9x + 4y - 9$  

Distribute 4.  
Use the Commutative Property.  
Add the like terms $4x$ and $5x$.  
No other terms are like terms.
Simplify each expression by applying the distributive property.

(a) $3(x - 2)$  
(b) $5(a - b)$  
(c) $-7(y - 8)$  
(d) $-6(x + 7)$

Simplify each expression by using the distributive property and combining like terms where possible.

(a) $3(x + 6) - 2$  
(b) $7y + 2(y - 5) + y$  
(c) $-5(x - 2) - 2x + 6$

**Guided Practice**

Simplify each expression by combining like terms (if possible).

1. $32y + 17y$  
2. $8.3p^2 + 4.8p$  
3. $-22n + 18n - 15$

4. $3x + 8x^2 - 11x$  
5. $-6 + 7m + 8$  
6. $9x^2 - 4x - 12x - 15x^2$

Simplify each expression by using the distributive property and combining like terms where possible.

7. $-3(8x + 4) + \frac{1}{2}(6x - 24)$  
8. $4(x + 9) + 5x$  
9. $-2(y - 6) + 12$

10. $\frac{1}{3}(3x - 9) + 13x$  
11. $5x - \frac{1}{4}(8x^2 - 20x)$  
12. $-4(3d - 1) + 2(7d + 9)$

Write an expression for the perimeter of the figures shown below.

13.  

14.  

![Diagram of a quadrilateral with sides 42x, 36x, 3x, and 3(x - 2)]

![Diagram of a triangle with sides 4x + 8, 3x, and 3(x - 2)]
Solving One-Step Equations Review & Practice

Solve each equation for the indicated variable.

1. \( x - (-3) = 17 \)
2. \( 41 = w - 4 \)
3. \( k - 8 = -19 \)

4. \( t - 5 = 12 \)
5. \( -2 + d = 97 \)
6. \( -7 + x = -18 \)

7. \( \frac{5}{8} = t - \frac{3}{8} \)
8. \( -\frac{3}{7} + c = -\frac{3}{7} \)
9. \( x - \frac{4}{7} = \frac{3}{7} \)

10. \( \frac{k}{9} = -8 \)
11. \( \frac{x}{-12} = -4 \)
12. \( -16 = \frac{t}{-2} \)

13. \( 24x = -12 \)
14. \( -y = -145 \)
15. \( -7m = -49 \)
Solve each equation for the indicated variable.

1. \(4a + 3 = 11\)  
2. \(8 = 3r - 1\)  
3. \(42 = -2d + 6\)

4. \(3x + 0.3 = 3.3\)  
5. \(15y + 31 = 61\)  
6. \(9 - c = -13\)

7. \(\frac{x}{6} + 4 = 15\)  
8. \(4 - \frac{m}{2} = 10\)  
9. \(7y - 7 = 0\)

10. \(3t + 7 = 19\)  
11. \(28 = 4x - 12\)  
12. \(6h - 7 = 17\)

13. \(3x + 3 = 18\)  
14. \(3t + 44 = 50\)  
15. \(15 = \frac{c}{3} - 2\)

16. \(6 + 6x = 30\)  
17. \(9 - 6x = 45\)  
18. \(32 = 5 - 3t\)

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Look at me... I’m Mrs. Lenart’s spirit animal
Solving Multi-Step Equations & Equations with Variables on Both Sides Review & Practice

Example: $3x + 2(2x - 1) = 33$

1. Use Distributive Property
2. Combine Like terms
3. Use Inverse Operations

Solve each equation for the indicated variable.

1. $2(x-7) = 10$
2. $\frac{m}{6} + 4 = 12$
3. $5(c+2) = -20$

4. $12a + 5 - 8a = -1$
5. $m - 3 - 6m = -27$
6. $-4 + 7d + 13 = 33$

7. $b + 11 - 2b = 6$
8. $5j - 9j + 3 = -34$
9. $-2d - 5 - 2d = -9$
Solve $7n - 2 = 5n + 6$.

$7n - 2 = 5n + 6$

To collect the variable terms on one side, subtract $5n$ from both sides.

$-5n\quad -5n$

$2n - 2 = 6$

$+2\quad +2$

$2n = 8$

Since $n$ is multiplied by 2, divide both sides by 2 to undo the multiplication.

$n = 4$

Solve each equation for the indicated variable.

1. $4x + 24 = 6x$

2. $3y - 8 = 13 - 4y$

3. $5x = 14 - 2x$

4. $8x - 1 = 47 - 4x$

5. $20 + x = 2 - 5x$

6. $39x = 33x - 30$

7. $\frac{x}{2} + 5 = x$

8. $\frac{4}{5}x = 6 - \frac{1}{5}x$

9. $4y + 5 = 6y + 7$
Equations, Equations, and more Equations...

Solve each equation for the given variable. Please circle, rectangle, or triangle your answer.

1. $4x - 7 = 37$
2. $3x = 6 - 9$
3. $8 - 9y = 35$

4. $7x - 12 = 2$
5. $8 - 12x = 32$
6. $0 = 25x + 75$

7. $4e + 16 = -12$
8. $3n - 9 = 9$
9. $3x + 12 + 5 = 35$

10. $9x - 3 = 24$
11. $5 - \frac{1}{2} x = -9$
12. $12 = \frac{2}{3} x - 2$

13. $13x + 50 = -54$
14. $\frac{x}{3} - 8 = -12$
15. $3 - \frac{1}{5} x = -7$

16. $7 - \frac{1}{9} k = 32$
17. $\frac{2x}{5} + 3 = 9$
18. $7 = -4m - 5$
19. $\frac{1}{4}x + 2 = 11$
20. $8 - \frac{1}{2}y = -6$
21. $5n - 8 = -23$

22. $6x - 2 = 22$
23. $5t - 8 = -18$
24. $6x - 5 = -41$

25. $4(3y - 1) = 5y - 11$
26. $-7a = -12a + 65$
27. $4(x + 2) = 6x + 10$

28. $5x + 2(1 - x) = 2(2x - 1)$
29. $3(2 + v) = 5v + 16$
30. $\frac{x}{2} + 5 = x$