

Alg 1 1.4

$$\begin{array}{l} 3(50 + 6) = 3 \cdot 50 + 3 \cdot 6 \\ = 150 + 18 \\ = 168 \end{array}$$

Use the distributive property to evaluate expressions

Use the distributive property to simplify expressions

term
like terms
coefficient

$$\begin{array}{l} 3(x + 5) = 3 \cdot x + 3 \cdot 5 \\ = 3x + 15 \end{array}$$

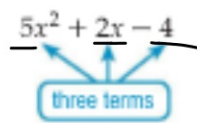
Example 3 Algebraic Expressions



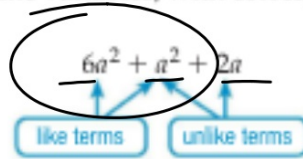
Rewrite each expression using the Distributive Property. Then simplify.

a. $7(3w + 5)$ $= 7 \cdot 3w + 7 \cdot 5$
 $= 21w + 35$

Like terms are terms that contain the same variables, with corresponding variables having the same power.

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


three terms

$$6a^2 + a^2 + 2a$$


like terms unlike terms

$$a^2 + a^2 + a^2 + a^2 + a^2 + a^2 + a^2$$

$$7a^2 + 2a$$

Simplify each expression. If not possible, write *simplified*.

4A. $6n - 4n = 2n$

4B. $\underline{b^2} + \underline{13b} + \underline{13}$

4C. $\textcircled{4y^3} + \textcircled{2y} - \textcircled{8y} + 5$

4D. $\underline{7a} + 4 - 6a^2 - \underline{2a}$

$$4y^3 - 6y + 5$$

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

$$(4y)^3$$

Example 5 Write and Simplify Expressions

Use the expression twice the difference of $3x$ and y increased by five times the sum of x and $2y$.

a. Write an algebraic expression for the verbal expression.

Words

twice the difference
of $3x$ and y

increased by

five times the sum
of x and $2y$

$$2 \cdot (3x - y) + 5(x + 2y)$$

$2 \cdot 3x$ $2 \cdot -y$ $5 \cdot x$ $5 \cdot 2y$

Guided Practice

i. Use the expression 5 times the difference of q squared and r plus 8 times the sum of $3q$ and $2r$.

A. Write an algebraic expression for the verbal expression.

B. Simplify the expression, and indicate the properties used.

$$5 \cdot (q^2 - r) + 8 \cdot (3q + 2r)$$
$$5q^2 + (-5r) + 24q + 16r$$
$$5q^2 + 11r + 24q$$

ConceptSummary Properties of Numbers

The following properties are true for any numbers a , b , and c .

Properties	Addition	Multiplication
Commutative $3+5=5+3$	$a + b = b + a$	$ab = ba$
Associative $(2+3)+5=2+(3+5)$	$(a + b) + c = a + (b + c)$	$(ab)c = a(bc)$
Identity $a+0$ $a \cdot 1$	0 is the identity. $a + 0 = 0 + a = a$	1 is the identity. $a \cdot 1 = 1 \cdot a = a$
Zero $3 \cdot 0 = 0$	—	$a \cdot 0 = 0 \cdot a = 0$
Distributive $3(x+5) = (x+5)+(x+5)+(x+5)$	$a(b + c) = ab + ac$ and $(b + c)a = ba + ca$	
Substitution $3x + 3 \cdot 5$	If $a = b$, then a may be substituted for b .	

Simplify each expression.

42. $6x + 4y + 5x$ $11x + 4y$

43. $3m + 5g + 6g + 11m$ $11g + 14m$

44. $4a + 5a^2 + 2a^2 + a^2$ $8a^2 + 4a$

45. $5k + 3k^3 + 7k + 9k^3$

$12k^3 + 12k$

46. $6d + 4(3d + 5)$

$12d + 20$

$18d + 20$

47. $2(6x + 4) + 7x$

$12x + 8 + 7x$

$19x + 8$

~~$27x$~~