

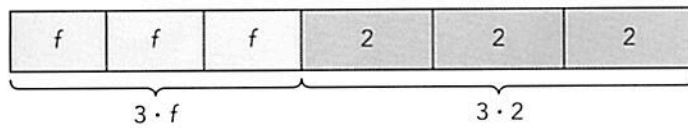
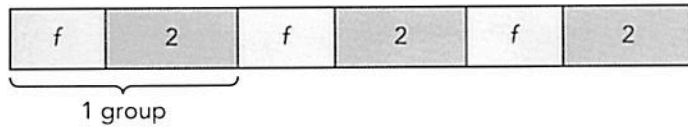
## Lesson 7.4 Expanding and Factoring Algebraic Expressions

Expand each expression.

*Example*

$$3(f + 2)$$

$3(f + 2)$  means 3 groups of  $(f + 2)$ :



$$3(f + 2) = 3 \cdot (f + 2)$$

$$= \underline{\quad 3 \cdot f \quad} + \underline{\quad 3 \cdot 2 \quad}$$

$$= \underline{\quad 3f + 6 \quad}$$

$3(f + 2)$  is the same as  $3 \cdot (f + 2)$ .

$$3 \cdot (f + 2)$$

$$= (f + 2) + (f + 2) + (f + 2)$$

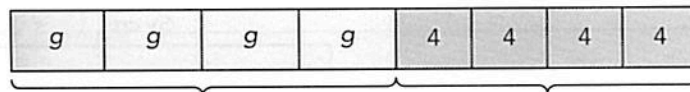
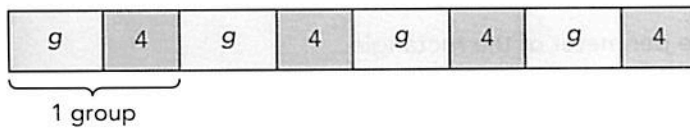
$$= f + f + f + 2 + 2 + 2$$

$$= 3f + 6$$

○



1.  $4(g + 4)$



$$\underline{\quad} \cdot \underline{\quad} \quad \underline{\quad} \cdot \underline{\quad}$$

$$4(g + 4) = 4 \cdot (g + 4)$$

$$= \underline{\quad} + \underline{\quad}$$

$$= \underline{\quad}$$

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2.  $2(h + 7)$

3.  $9(k - 4)$

4.  $6(7s + 9)$

5.  $3(9c - 6)$

**State whether each pair of expressions is equivalent.**

6.  $6(2u + 3)$  and  $6u + 18$  \_\_\_\_\_

7.  $3(2h - 5)$  and  $6h - 15$  \_\_\_\_\_

8.  $8(g + 2)$  and  $16 + 8g$  \_\_\_\_\_

9.  $7(2k - 4)$  and  $28 - 14k$  \_\_\_\_\_

**Factor each expression.**

*Example*

$$4y + 2$$

The factors of  $4y$  are:

The factors of 2 are:

$$1 \cdot 4y$$

$$1 \cdot 2$$

$$2 \cdot \underline{2y}$$

$$4 \cdot \underline{1y}$$

The common factor of  $4y$  and 2 is 2.

$$4y = \underline{2} \cdot \underline{2y}$$

$$2 = \underline{2} \cdot \underline{1}$$

$$4y + 2 = \underline{2} \cdot \underline{2y} + \underline{2} \cdot \underline{1}$$

$$= \underline{2(2y + 1)}$$

To factor an expression, look for common factors in the terms of the expression.



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10.  $3d + 9$

The factors of  $3d$  are:

$1 \cdot 3d$

$3 \cdot \underline{\hspace{2cm}}$

The factors of 9 are:

$1 \cdot 9$

$3 \cdot \underline{\hspace{2cm}}$

$9 \cdot \underline{\hspace{2cm}}$

The common factor of  $3d$  and 9 is \_\_\_\_\_.

$3d = \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}}$

$9 = \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}}$

$3d + 9 = \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}} + \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}}$   
 $= \underline{\hspace{4cm}}$

11.  $24g + 8$

12.  $21b - 7$

13.  $45h + 5$

14.  $54z - 6$

**State whether each pair of expressions is equivalent.**

15.  $22s + 18$  and  $2(11s + 9)$  \_\_\_\_\_

16.  $6h + 15$  and  $3(2h - 5)$  \_\_\_\_\_

17.  $20p + 14$  and  $4(5p + 3)$  \_\_\_\_\_

18.  $15f - 9$  and  $5(3f - 9)$  \_\_\_\_\_

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**Simplify each expression. Then factor the expression.**

*Example*

$$9m + 19 + 4m + 7$$

$$= \underline{9m} + \underline{4m} + \underline{19} + \underline{7}$$

Identify like terms. Change the order of terms to collect like terms.

$$= \underline{13m} + \underline{26}$$

Simplify.

$$= \underline{13(m + 2)}$$

Factor.

19.  $6p + 2 + 4p + 13$

$$= \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}$$

Identify like terms. Change the order of terms to collect like terms.

$$= \underline{\quad} + \underline{\quad}$$

Simplify.

$$= \underline{\quad}$$

Factor.

20.  $2v + 11 + 3 + 5v$

21.  $9(6a + 7) - 6 - 3a$

22.  $6(3 + 2s) + 4(s + 8)$