

Challenge: Skills and Applications

For use with pages 100–107

For Exercises 1–6, simplify the expression.

1. $3(x - 4y) - 2(y + 7x)$
2. $n(n + 5) + 4(-n + 3n^2)$
3. $-5[3y - 2(6 - y)]$
4. $6b(a + 4) - 2a(b - 4)$
5. $7[2(p - 7) - (1 - 4p)]$
6. $k[3 - (k + 2)] + 5(k^2 - 4k)$

7. Use the distributive property three times to show that the expression $(a + b)(c + d)$ is equivalent to the expression $ac + ad + bc + bd$.
8. Suppose you buy 4 bottles of shampoo for \$.89 each and 3 tubes of toothpaste for \$1.08 each. You can think of dollar amounts and use mental math to find the cost of your purchases (without tax). The following steps show why the mental math technique works. Name the property or properties that make each statement true.

$$4(0.89) + 3(1.08) = 4(1 - 0.11) + 3(1 + 0.08)$$

Write 0.89 as a difference and 1.08 as a sum.

- a. $= 4 - 0.44 + 3 + 0.24$
- b. $= 4 + (-0.44) + 3 + 0.24$
- c. $= 4 + 3 + (-0.44) + 0.24$
- d. $= 7 + (-0.20 + -0.24) + 0.24$
- e. $= 7 + (-0.20) + (-0.24 + 0.24)$
- f. $= 7 + (-0.20) + 0$
- g. $= 7 + (-0.20)$
- h. $= \$6.80$

9. In a state with a 5% sales tax on non-clothing items, Derek spent \$80 at a department store, \$44 of which was spent on clothing. The clerk, however, figured the tax based on the full \$80. When Derek pointed out the mistake, the clerk said, "I'll just take the amount you spent on clothing, multiply it by the tax rate, and deduct that amount."
 - a. Write an expression for the tax according to the clerk's method, and evaluate it.
 - b. Write an expression for the tax as it should have been computed, and evaluate it.
 - c. Did the clerk's method give the correct answer?