

**Challenge: Skills and Applications**

For use with pages 716–721

In Exercises 1–7, simplify the expression.

1.  $\frac{5}{\sqrt{3}} + \frac{7}{\sqrt{12}}$

2.  $\frac{2\sqrt{3}}{\sqrt{15}} - \frac{4}{\sqrt{20}}$

3.  $3\sqrt{2}(5x\sqrt{7} - 4\sqrt{2})$

4.  $-2x\sqrt{3}(4\sqrt{12} + \sqrt{3})$

5.  $\frac{2}{\sqrt{5}}(8\sqrt{30} - \sqrt{120})$

6.  $7x\sqrt{5}(\sqrt{20} - 3\sqrt{5})$

7.  $(x\sqrt{3} - \sqrt{6})(2x\sqrt{3} + \sqrt{6})$

8. Suppose a quantity called  $i$  has the property that, in any calculation,  $i^2$  could always be replaced by  $-1$ , but otherwise  $i$  behaves like any variable. Simplify each expression. Give your answer in terms of  $i$ .

a.  $(3 + 4i)^2$

b.  $(5 - 8i)(7 + 4i)$

c.  $(2 + 5i)(2 - 5i)$

d. Generalize part (c) by expressing  $(a + bi)(a - bi)$  in terms of  $a$  and  $b$ .

In Exercises 9–14, use the figure. Write answers as a radical expression in simplest form.

9. Find the perimeter of triangle  $BCD$ .10. Find the perimeter of triangle  $ABD$ .11. How much longer is the perimeter of triangle  $BCD$  than the perimeter of triangle  $ABD$ ?12. Find the area of triangle  $BCD$ .13. Find the area of triangle  $ABD$ .14. If the area of triangle  $ABD$  is  $2\sqrt{6}$ , what is  $x$ ?