

Challenge: Skills and Applications

For use with pages 619–624

In Exercises 1–6, factor the expression. Tell which special product factoring pattern you used.

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| 1. $49r^2s^2 - 100t^2$ | 2. $(b + 3)^2 - 49$ |
| 3. $(x + 8)^2 - 6(x + 8) + 9$ | 4. $r^4 - 18r^2 + 81$ |
| 5. $k^4 - 16$ | 6. $25 - (n^2 + 1)^2$ |

In Exercises 7–10, use factoring to solve the equation.

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| 7. $16a^4 - 81 = 0$ | 8. $(a + 2)^2 - 49 = 0$ |
| 9. $x^4 - 12x^2 + 36 = 0$ | 10. $(x - 9)^2 + 10(x - 9) + 25 = 0$ |
11. a. Multiply $(x - 3)(x^3 + 3x^2 + 9x + 27)$
- b. Use the result of part (a) to suggest a formula for factoring a difference of two fourth powers. Use multiplication to check your result.
- c. Do you think the formula you found in part (b) can be extended to fifth powers, sixth powers, and so on? If so, state the formula for any positive integer n . If not, explain why not.
12. a. By rewriting $x^4 + 64$ in the form $(x^4 + 16x^2 + 64) - 16x^2$, write this expression as a difference of two squares.
- b. Use the formula for the difference of two squares to factor the expression you wrote in part (a).
- c. Use the method of parts (a) and (b) to factor $x^4 + 1024$.