

4.4**Practice A**

In Exercises 1–6, factor the polynomial completely.

1. $x^3 - x^2 - 12x$

2. $9p^7 - 36p^5$

3. $3n^6 - 33n^5 + 72n^4$

4. $2k^4 - 242k^2$

5. $2w^4 - 7w^3 - 15w^2$

6. $3q^6 - 17q^5 - 28q^4$

In Exercises 7–9, factor the polynomial completely.

7. $x^3 + 27$

8. $y^3 + 1000$

9. $w^3 - 125$

In Exercises 10–13, factor the polynomial completely.

10. $y^3 - 3y^2 + 4y - 12$

11. $q^3 - 2q^2 + 9q - 18$

12. $2d^3 + 10d^2 + 3d + 15$

13. $x^3 - 6x^2 - 9x + 54$

In Exercises 14–16, factor the polynomial completely.

14. $36p^4 - 25$

15. $n^4 + 11n^2 + 28$

16. $y^4 - 16$

In Exercises 17–20, determine whether the binomial is a factor of the polynomial function.

17. $f(x) = 3x^3 + 7x^2 - 8x - 5$; $x + 5$

18. $f(x) = 2x^3 + 15x^2 - 23x + 36$; $x + 9$

19. $f(x) = 6x^5 - 8x^4 - 6x^3 - 4x^2$; $x - 2$

20. $f(x) = 12x^3 - 69x^2 + 39x + 30$; $x - 6$

21. Fill in the blank of the divisor so that the remainder is 0. Justify your answer.

$$f(x) = x^3 + 5x^2 - 6x; (x - \underline{\quad})$$

22. What is the value of k such that $x - 6$ is a factor of $f(x) = 3x^3 - 17x^2 - kx + 18$? Justify your answer.

23. Factor each polynomial completely.

a. $5a^2c - 3a^2d + 5b^2c - 3b^2d$

b. $x^{2n} + 6x^n + 9$