

6-5**Practice**

Dividing Polynomials

Divide using long division. Check your answers.

1. $(x^2 - 13x - 48) \div (x + 3)$

2. $(2x^2 + x - 7) \div (x - 5)$

3. $(x^3 + 5x^2 - 3x - 1) \div (x - 1)$

4. $(3x^3 - x^2 - 7x + 6) \div (x + 2)$

5. $(x^2 - 3x + 1) \div (x - 4)$

6. $(x^3 - 4x^2 + 3x + 2) \div (x + 2)$

Determine whether each binomial is a factor of $x^3 + 3x^2 - 10x - 24$.

7. $x + 4$

8. $x - 3$

9. $x + 6$

10. $x + 2$

Divide using synthetic division.

11. $(x^3 - 8x^2 + 17x - 10) \div (x - 5)$

12. $(x^3 + 5x^2 - x - 9) \div (x + 2)$

13. $(-2x^3 + 15x^2 - 22x - 15) \div (x - 3)$

14. $(x^3 + 7x^2 + 15x + 9) \div (x + 1)$

15. $(x^3 + 2x^2 + 5x + 12) \div (x + 3)$

16. $(x^3 - 5x^2 - 7x + 25) \div (x - 5)$

17. $(x^4 - x^3 + x^2 - x + 1) \div (x - 1)$

18. $(2x^4 + 7x^3 - 11x^2 + 21x + 5) \div (x + 5)$

19. $(x^4 - 5x^3 + 5x^2 + 7x - 12) \div (x - 4)$

20. $(2x^4 + 23x^3 + 60x^2 - 125x - 500) \div (x + 4)$

Use synthetic division and the given factor to completely factor each polynomial function.

21. $y = x^3 + 3x^2 - 13x - 15; (x + 5)$

22. $y = x^3 - 3x^2 - 10x + 24; (x - 2)$

23. $y = x^3 + x^2 - 10x + 8; (x - 1)$

24. $y = x^3 + 4x^2 - 9x - 36; (x + 3)$

25. The expression $V(x) = x^3 - 13x + 12$ represents the volume of a rectangular safe in cubic feet. The length of the safe is $x + 4$. What linear expressions with integer coefficients could represent the other dimensions of the safe? Assume that the height is greater than the width.

Use synthetic division and the Remainder Theorem to find $P(a)$.

26. $P(x) = 3x^3 - 4x^2 - 5x + 1; a = 2$

27. $P(x) = x^3 + 7x^2 + 12x - 3; a = -5$

28. $P(x) = x^3 + 6x^2 + 10x + 3; a = -3$

29. $P(x) = 2x^4 - 9x^3 + 7x^2 - 5x + 11; a = 4$