



Practice and Apply

Write each product as a polynomial in standard form.

14. $3x^2(4x^3 - 2x^2 + 5x + 2)$

16. $(2x - 3)(x + 4)$

18. $(x + 2)(x^2 + 4x + 1)$

20. $(2x + 3)(x^3 - 5x^2 + 4)$

22. $(x - 4)(2x^3 - 3x^2 + 2)$

24. $(x - 3)(2 - x)(x - 1)$

26. $(x + 1)^2(x - 2)$

28. $(2x + 1)^3$

30. $(x - 1)^2(x^2 - 3x + 2)$

32. $\left(x - \frac{5}{7}\right)\left(\frac{2}{5}x^2 - \frac{1}{5}x + \frac{3}{5}\right)$

15. $2x^3(4x^3 - 2x^2 + x + 3)$

17. $(x + 7)(5x - 3)$

19. $(x + 3)(2x^3 + 3x^2 + 1)$

21. $(2x + 1)(x^2 - 4x - 3)$

23. $(x - 5)(-3x^3 - 4x - 1)$

25. $(x - 2)(2x + 3)(3 - x)$

27. $(2x - 4)(x + 1)^2$

29. $(3x + 2)^3$

31. $(-3x^2 - x + 2)(x + 1)^2$

33. $\left(x - \frac{1}{4}\right)\left(\frac{2}{3}x^2 + \frac{1}{3}x + \frac{2}{3}\right)$

Use substitution to determine whether the given linear expression is a factor of the polynomial.

61. $x^2 + x + 1; x - 1$

63. $x^3 + 3x^2 - 33x - 35; x + 1$

65. $x^3 + 3x^2 - 18x - 40; x - 4$

67. $x^3 + 6x^2 - x - 30; x - 2$

69. $2x^3 + 9x^2 + 6x + 8; x + 4$

62. $x^2 + 2x + 1; x + 2$

64. $x^3 + 5x^2 - 18x - 48; x + 6$

66. $x^3 - 8x^2 + 9x + 18; x - 6$

68. $x^3 - x^2 - 17x - 15; x + 3$

70. $2x^3 - x^2 - 12x - 9; x - 3$

Divide by using long division.

71. $(x^2 + 4x + 4) \div (x + 2)$

73. $(x^3 - 7x - 6) \div (x + 1)$

75. $(3x^2 - x + x^3 - 3) \div (x^2 + 4x + 3)$

77. $(x^3 - 43x + 42) \div (x^2 + 6x - 7)$

79. $\left(x^2 - \frac{1}{6}x - \frac{1}{6}\right) \div \left(x - \frac{1}{2}\right)$

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

74. $(x^3 + 11x^2 + 39x + 45) \div (x + 5)$

76. $(x^3 + 6x^2 - x - 30) \div (x^2 + 8x + 15)$

78. $(10x - 5x^2 + x^3 - 24) \div (x^2 - x + 6)$

80. $\left(x^2 + \frac{1}{2}x - \frac{3}{16}\right) \div \left(x + \frac{3}{4}\right)$

Divide by using synthetic division.

81. $(x^2 - 4x - 12) \div (x - 4)$

83. $(x^3 + x^2 - 9x - 9) \div (x + 1)$

85. $(x^3 + 5x^2 - 18) \div (x + 3)$

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

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

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

84. $(x^3 - 2x^2 - 22x + 40) \div (x - 4)$

86. $(x^3 - 27) \div (x - 3)$

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

90. $(x^5 + 6x^3 - 5x^4 + 5x - 15) \div (x - 3)$