

Factoring - ANSWERS

F.1 Exercises

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|------------------------------|-----------------------------|-----------------------------|-------------------------|
| 1. product | 3. distributive | 5. prime | 7. true |
| 9. $2x$ | 11. $x(x - 1)$ | 13. $3(a - 5)$ | 15. $3x^{-3}y^{-5}$ |
| 17. $9x(x - 9)$ | 19. $-3p^2(3p^2 - 2p + 1)$ | 21. $5r^2s^2(3r^2 - 2)$ | 23. $(x - 2)(a + b)$ |
| 25. $2(x - 2)(x + 4)$ | 27. $(x - 1)(x - 5)$ | 29. $(x - 3)(x^2 - 2x - 6)$ | 31. $x^{-3}(x + 3)$ |
| 33. $x^{-4}(7x^2 - 2x + 1)$ | 35. $-x^{-3}y(xy - 3)$ | 37. $(x + 4)(3y + 5)$ | 39. $(a + b)(c - d)$ |
| 41. $(x - 2y)(3x + 4y)$ | 43. $(3p - q)(p + 3q)$ | 45. $(x^2 + 2)(2x - 1)$ | 47. $(x + b)(y + a)$ |
| 49. cannot be factored | 51. $(x^n + 2)(a^n + 1)$ | 53. $-5(a - 1)(x - bc)$ | |
| 55. $x(x - 2)(x - 1)(x + 1)$ | | 57. $P = \frac{A}{1+r}$ | 59. $t = \frac{c}{k-2}$ |
| 61. $A = (8 - \pi)x^2$ | 63. $A = \pi(R - r)(R + r)$ | | |

F.2 Exercises

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|---|----------------------------|---------------------------|----------------------------|
| 1. multiplication | 3. sum | 5. reducible; variable | |
| 7. No, the complete factorization would be $2(2x + 5)(x - 2)$. | | | |
| 9. It is prime. | 11. $x + 5$ | 13. $x + 7y$ | 15. $(x - 5)(x - 7)$ |
| 17. $(a - 7)(a + 6)$ | 19. not factorable | 21. $(y + 7)(y - 4)$ | 23. $-(p + 2)(p - 10)$ |
| 25. $(p + 5q)(p + 4q)$ | 27. $-(y + 2)(y - 16)$ | 29. $y(y - 6)(y - 9)$ | 31. $-3(x + 3)(x + 8)$ |
| 33. $-3ab^2(a + 2)(a - 4)$ | 35. $(x^2y + 6)(x^2y + 5)$ | 37. $-(x^a + 8)(x^a - 3)$ | 39. $2x + 1$ |
| 41. $2x + 5$ | 43. $(2x + 1)(x - 3)$ | 45. $(4m + 1)(m + 4)$ | 47. $(2x + 5)(5x - 1)$ |
| 49. $3(p - 1)(p - 8)$ | 51. $(x + 7y)(6x - y)$ | 53. $(2a - 1)(3a - 8)$ | 55. $3x^2(5x + 3)(2x - 1)$ |
| 57. $(2y^3 + 3x)(y^3 + 2x)$ | 59. $y(4xy - 1)(4xy - 3)$ | 61. $(2x - 5)^2$ | 63. $(2x^a + 1)(2x^a - 3)$ |
| 65. $(x^2 + 2x) \text{ ft}^2$ | | | |

F.3 Exercises

1. difference of squares 3. sum of cubes 5. sum of squares 7. difference of squares
 9. neither 11. difference of cubes 13. difference of squares 15. perfect square
 17. difference of cubes 19. only if both terms have a common factor 21. $(x + y)(x - y)$
 23. $(x - y)(x^2 + xy + y^2)$ 25. $(2z - 1)^2$ 27. not factorable
 29. $(5 - y)(25 + 5y + y^2)$ 31. $(n + 10m)^2$
 33. $(3a^2 + 5b^3)(3a^2 - 5b^3)$ 35. $(p^2 - 4q)(p^4 + 4p^2q + 16q^2)$
 37. $(7p + 2)^2$ 39. $r^2(r + 3)(r - 3)$
 41. $\frac{1}{8}(1 - 2a)(1 + 2a + 4a^2)$ or $(\frac{1}{2} - a)(\frac{1}{4} + \frac{1}{2}a + a^2)$ 43. not factorable
 45. $x^2(4x^2 + 11y^2)(4x^2 - 11y^2)$ 47. $-(ab + 5c^2)(a^2b^2 - 5abc^2 + 25c^4)$
 49. $(3a^4 - 8b)^2$ 51. $(x + 8)(x - 6)$ 53. $2t(t - 4)(t^2 + 4t + 16)$
 55. $(x^n + 3)^2$ 57. $(4z^2 + 1)(2z + 1)(2z - 1)$ 59. $5(3x^2 + 15x + 25)$
 61. $0.01(5z - 7)^2$ or $(0.5z - 0.7)^2$ 63. $-3y(2x - y)$ 65. $4(3x^2 + 4)$
 67. $2(x - 5a)^2$ 69. $(y + 6 + 3a)(y + 6 - 3a)$
 71. $(m + 2)(m^2 - 2m + 4)(m - 1)(m^2 + m + 1)$ 73. $(a^4 + b^4)(a^2 + b^2)(a + b)(a - b)$
 75. $(x^2 + 1)(x + 3)(x - 3)$ 77. $(a + b + 3)(a - b - 3)$
 79. $z(3xy + 4z)(xy + 7z)$ 81. $(x^2 + 1)(x + 1)(x - 1)^3$
 83. $c(c^w + 1)^2$

F.4 Exercises

1. zero-product 3. zero; factored 5. true 7. false
 9. false 11. $x \in \{-4, 1\}$ 13. $x \in \{-\frac{4}{5}, -\frac{1}{3}\}$ 15. $x \in \{-6, -3\}$
 17. $x \in \{-\frac{7}{2}, 1\}$ 19. $x \in \{-6, 0\}$ 21. $x \in \{4\}$ 23. $x \in \{\frac{5}{2}\}$
 25. $x \in \{-8, 4\}$ 27. $x \in \{\frac{1}{3}, 3\}$ 29. $x \in \{-2, \frac{8}{9}\}$ 31. $x \in \{0, 6\}$
 33. $x \in \{-4, 2\}$ 35. $x \in \{1, 5\}$ 37. $x \in \{-\frac{15}{8}, -1\}$ 39. $x \in \{-5, 0, 3\}$

41. $x \in \left\{-\frac{8}{5}, 0, \frac{8}{5}\right\}$

43. $x \in \{-5, -1, 1, 5\}$

45. $x \in \{0, 2, 4\}$

47. $x \in \{-3, -1, 3\}$

49. $x \in \left\{-2, -\frac{2}{5}, 2\right\}$

51. No. The solution set is $\{-3, 0, 3\}$. She lost the 0 root when dividing the equation by x .

53. $x \in \left\{\frac{1}{2}, 7\right\}$

55. $x \in \left\{-3, \frac{7}{3}\right\}$

57. $s = \frac{5-2p}{r+3}$

59. $r = \frac{R}{E-1}$

61. $t = \frac{4}{c+2}$

63. In 7.5 seconds

65. -15 or 14

67. width = 8 cm; length = 12 cm

69. base = 7 m; height = 16 m

71. 9 m by 12 m

73. 2 cm

75. 3 m