

Section 5.9 Factoring Trinomials of the Form $x^2 + bx + c$

Section 5.9 Practice Exercises

1. (a) positive

(b) different

$$\begin{aligned} \text{(c)} \quad (x+4)(x-11) &= (x-11)(x+4) \\ &= x^2 + 4x - 11x - 44 \\ &= x^2 - 7x - 44 \end{aligned}$$

Both are correct.

(d) The factorization $(3x+6)(x+6)$ can be factored further as $3(x+6)(x+2)$. $3(x+6)(x+2)$ is the complete factorization.

$$\begin{aligned} \text{3.} \quad 3t(t-5) - 6(t-5) \\ = 3(t-5)(t-2) \end{aligned}$$

5. $ax + 2bx - 5a - 10b$
 $= x(a + 2b) - 5(a + 2b)$
 $= (a + 2b)(x - 5)$
7. $x^2 + 10x + 16 = (x + 8)(x + 2)$
9. $z^2 - 11z + 18 = (z - 9)(z - 2)$
11. $z^2 - 3z - 18 = (z - 6)(z + 3)$
13. $p^2 - 3p - 40 = (p - 8)(p + 5)$
15. $t^2 + 6t - 40 = (t + 10)(t - 4)$
17. $x^2 - 3x + 20$ is prime
19. $n^2 + 8n + 16 = (n + 4)(n + 4) = (n + 4)^2$
21. a
23. c
25. They are both correct because multiplication of polynomials is a commutative operation.
27. The expressions are equal and both are correct
29. It should be written in descending order.
31. $-13x + x^2 - 30 = x^2 - 13x - 30$
 $= (x - 15)(x + 2)$
33. $-18w + 65 + w^2 = w^2 - 18w + 65$
 $= (w - 13)(w - 5)$
35. $22t + t^2 + 72 = t^2 + 22t + 72$
 $= (t + 18)(t + 4)$
37. $3x^2 - 30x - 72 = 3(x^2 - 10x - 24)$
 $= 3(x - 12)(x + 2)$
39. $8p^3 - 40p^2 + 32p = 8p(p^2 - 5p + 4)$
 $= 8p(p - 1)(p - 4)$
41. $y^4z^2 - 12y^3z^2 + 36y^2z^2$
 $= y^2z^2(y^2 - 12y + 36)$
 $= y^2z^2(y - 6)(y - 6)$ or $y^2z^2(y - 6)^2$
43. $-x^2 + 10x - 24 = -(x^2 - 10x + 24)$
 $= -(x - 4)(x - 6)$
45. $-5a^2 + 5ax + 30x^2 = -5(a^2 - ax - 6x^2)$
 $= -5(a - 3x)(a + 2x)$
47. $-4 - 2c^2 - 6c = -2(c^2 + 3c + 2)$
 $= -2(c + 2)(c + 1)$
49. $x^2y^3 - 19x^2y^3 + 60xy^3$
 $= xy^3(x^2 - 19x + 60)$
 $= xy^3(x - 15)(x - 4)$
51. $12p^2 - 96p + 84 = 12(p^2 - 8p + 7)$
 $= 12(p - 7)(p - 1)$
53. $-2m^2 + 22m - 20 = -2(m^2 - 11m + 10)$
 $= -2(m - 10)(m - 1)$
55. $c^2 + 6cd + 5d^2 = (c + 5d)(c + d)$
57. $a^2 - 9ab + 14b^2 = (a - 2b)(a - 7b)$
59. $a^2 + 4a + 18$ is Prime
61. $2q + q^2 - 63 = q^2 + 2q - 63$
 $= (q - 7)(q + 9)$
63. $x^2 + 20x + 100 = (x + 10)(x + 10)$
 $= (x + 10)^2$
65. $t^2 + 18t - 40 = (t + 20)(t - 2)$
67. The student forgot to factor out the GCF before factoring the trinomial further. The polynomial is not factored completely, because $(2x - 4)$ has a common factor of 2.
69. $(x - 4)(x + 13) = x^2 + 9x - 52$
71. (a) $5x + 2x - 3 + 3x^2 - 5 + 2x - 4$
 $= 3x^2 + 9x - 12$
 (b) $3x^2 + 9x - 12 = 3(x^2 + 3x - 4)$
 $= 3(x + 4)(x - 1)$

73. $x^4 + 10x^2 + 9 = (x^2 + 1)(x^2 + 9)$

75. $w^4 + 2w^2 - 15 = (w^2 + 5)(w^2 - 3)$

77. 7, 5, -7, -5

79. For example, $c = -16$