

■ Simplify each expression.

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|---|---|-------------------------------|
| 19. $(x^2y)^2 + (xy)^3$ | 20. $(2xy^3)^4 + (3xy)^2$ | 21. $(2rst^2)^2 - (rst^2)^2$ |
| 22. $(3r^2st)^3 - (4r^2s^2t^2)^2$ | 23. $(-mn)^2 - mn^2(mn)^2$ | 24. $(m^2n)(mn)^2 + (mn^2)^2$ |
| 25. $(2x^2y)^2(xy) + (xy)^2$ | 26. $(xy)^2 + (-x^2y)^2(-xy)^2$ | |
| 27. $(2xy)^2 - 3x(x^2y)^2 + 4x(xy^2)$ | 28. $3(x^2y)^2 + x(x^2y) - x^2(x^2y^2)$ | |
| 29. $(u^2v)^2 - 2u^2(u^2v^2) + 3uv(u^3v)$ | 30. $2u^2(v^3) + 4v(uv)^2 - uv(uv^2)$ | |

■ Write each product as a polynomial and simplify. See Example 3.

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| 31. $4y(x - 2y)$ | 32. $3x(2x + y)$ |
| 33. $-6x(2x^2 - x + 1)$ | 34. $-2y(y^2 - 3y + 2)$ |
| 35. $a^2b(3a^2 - 2ab - b)$ | 36. $ab^3(-a^2b^2 + 4ab - 3)$ |
| 37. $2x^2y^3(4xy^4 - 2x^2y - 3x^3y^2)$ | 38. $5x^2y^2(3x^4y^2 + 3x^2y - xy^6)$ |

■ See Example 4.

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|--------------------------------------|------------------------------------|-----------------------------|
| 39. $(y + 2)(y^2 - 2y + 3)$ | 40. $(t + 4)(t^2 - t - 1)$ | 41. $(x - 3)(x^2 + 5x - 6)$ |
| 42. $(x - 7)(x^2 - 3x + 1)$ | 43. $(x - 2)(x - 1)(x + 3)$ | 44. $(y - 2)(y + 2)(y + 4)$ |
| 45. $(z - 3)(z + 2)(z + 1)$ | 46. $(z - 5)(z + 6)(z - 1)$ | |
| 47. $(2x + 3)(3x^2 - 4x + 2)$ | 48. $(3x - 2)(4x^2 + x - 2)$ | |
| 49. $(2a^2 - 3a + 1)(3a^2 + 2a - 1)$ | 50. $(b^2 - 3b + 5)(2b^2 - b + 1)$ | |

■ See Example 5.

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|--------------------------------|---------------------------------|------------------------|
| 51. $(n + 2)(n + 8)$ | 52. $(r - 1)(r - 6)$ | 53. $(r + 5)(r - 2)$ |
| 54. $(z - 3)(z + 5)$ | 55. $(2z + 1)(z - 3)$ | 56. $(3t - 1)(2t + 1)$ |
| 57. $(4r + 3s)(2r - s)$ | 58. $(2z - w)(3z + 5w)$ | |
| 59. $(2x - 3y)(3x - 2y)$ | 60. $(3a + 5b)(3a + 4b)$ | |
| 61. $(3t - 4s)(3t + 4s)$ | 62. $(2x - 3z)(2x + 3z)$ | |
| 63. $(2a^2 + b^2)(a^2 - 3b^2)$ | 64. $(s^2 - 5t^2)(3s^2 + 2t^2)$ | |

■ Simplify each expression. See Example 6.

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|---------------------------------------|---------------------------------------|
| 65. $2[a - (a - 1) + 2]$ | 66. $3[2a - (a + 1) + 3]$ |
| 67. $a[a - (2a + 3) - (a - 1)]$ | 68. $-2a[3a + (a - 3) - (2a + 1)]$ |
| 69. $2(x - [x - 2(x + 1) + 1] + 1)$ | 70. $-4(4 - [3 - 2(x - 1) + x] + x)$ |
| 71. $-x(x - 3[2x - 3(x + 1)] + 2)$ | 72. $x(4 - 2[3 - 4(x + 1)] - x)$ |
| 73. $-4[2x^2 - 2(x + 1)(x - 2) - 4x]$ | 74. $-3[2x^2 - 3(x - 2)(x + 3) + 3x]$ |
| 75. $x(x[x(x - 2) + 1] - 3) + 4$ | 76. $x(x[x(x + 3) - 2] - 3) - 5$ |

■ Solve. See Examples 9 and 10.

77. A football conference is made up of n teams. The expression $(\frac{1}{2})n(n - 1)$ gives the number of games that must be played in order for each team to play each other team once.
- Write the expression as a binomial.
 - How many games must be played if the conference has 10 teams?