

## Factoring

### Difference of Squares

$$1. x^2 - 9 = (x + 3)(x - 3)$$

$$2. x^2 - 36 = (x + 6)(x - 6)$$

$$3. x^2 - 49 = (x + 7)(x - 7)$$

$$4. x^2 - 64 = (x + 8)(x - 8)$$

$$5. y^2 - 81 = (y + 9)(y - 9)$$

$$6. y^2 - 144 = (y + 12)(y - 12)$$

$$7. z^2 - 256 = (z + 16)(z - 16)$$

$$8. z^2 - 400 = (z + 20)(z - 20)$$

$$9. a^2 - 576 = (a + 24)(a - 24)$$

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

$$11. 25 - y^2 = -1(y^2 - 25) = -1(y + 5)(y - 5)$$

$$12. 100 - z^2 = -1(z^2 - 100) = -1(z + 10)(z - 10)$$

$$13. x^4 - 25 = (x^2 + 5)(x^2 - 5)$$

$$14. y^4 - 81 = (y^2 + 9)(y^2 - 9) = (y^2 + 9)(y + 3)(y - 3)$$

$$15. b^4 - 169 = (b^2 + 13)(b^2 - 13)$$

$$16. 196 - x^6 = -1(x^6 - 196) = -1(x^3 + 14)(x^3 - 14)$$

$$17. 225 - z^8 = -1(z^8 - 225) = -1(z^4 + 15)(z^4 - 15)$$

$$18. 625 - a^{12} = -1(a^{12} - 625) = -1(a^6 + 25)(a^6 - 25) = -1(a^6 + 25)(a^3 + 5)(a^3 - 5)$$

$$19. 4x^2 - y^2 = (2x + y)(2x - y)$$

$$20. 9a^2 - 16b^2 = (3a + 4b)(3a - 4b)$$

$$21. x^4 - 16y^2 = (x^2 + 4y)(x^2 - 4y)$$

$$22. 25k^2 - 36l^4 = (5k + 6l^2)(5k - 6l^2)$$

$$23. 49a^2x^4 - 25b^2y^2 = (7ax^2 + 5by)(7ax^2 - 5by)$$

$$24. 81x^2 - 121y^2 = (9x + 11y)(9x - 11y)$$

$$25. 64a^4x^2 - 9z^2 = (8a^2x + 3z)(8a^2x - 3z)$$

$$26. 169x^4 - 100a^2y^2 = (13x^2 + 10ay)(13x^2 - 10ay)$$

$$27. x^2 - 144b^2y^2 = (x + 12by)(x - 12by)$$

$$28. 12x^2 - 75y^2 = 3(4x^2 - 25y^2) = 3(2x + 5y)(2x - 5y)$$

$$29. 20a^2x^2 - 45y^2 = 5(4a^2x^2 - 9y^2) = 5(2ax + 3y)(2ax - 3y)$$

$$30. 28x^2 - 63m^2n^2 = 7(4x^2 - 9m^2n^2) = 7(2x + 3mn)(2x - 3mn)$$

$$31. x^3 - 4xy^2 = x(x^2 - 4y^2) = x(x+2y)(x-2y)$$

$$32. 72a^2x^2 - 32a^4 = 8(9a^2x^2 - 4a^4) = 8a^2(3x+2a)(3x-2a)$$

$$33. 14x^2y^2 - 56y^4 = 14y^2(x^2 - 4y^2) = 14y^2(x+2y)(x-2y)$$

$$34. x^4 - y^4 = (x^2 + y^2)(x^2 - y^2) = (x^2 + y^2)(x+y)(x-y)$$

$$35. x^8 - 16y^4 = (x^4 + 4y^2)(x^4 - 4y^2) = (x^4 + 4y^2)(x^2 + 2y)(x^2 - 2y)$$

$$36. 81x^4 - 16y^4 = (9x^2 + 4y^2)(9x^2 - 4y^2) = (9x^2 + 4y^2)(3x+2y)(3x-2y)$$

$$37. 64a^8x^4 - 4b^4y^8 = 4(16a^8x^4 - b^4y^8) = 4(4a^4x^2 + b^2y^4)(4a^4x^2 - b^2y^4) = 4(4a^4x^2 + b^2y^4)(2a^2x + by^2)(2a^2x - by^2)$$

$$38. 162m^4 - 32n^8 = 2(81m^4 - 16n^8) = 2(9m^2 + 4n^4)(9m^2 - 4n^4) = 2(9m^2 + 4n^4)(3m + 2n^2)(3m - 2n^2)$$

$$39. 75x^4 - 27y^2 = 3(25x^4 - 9y^2) = 3(5x^2 + 3y)(5x^2 - 3y)$$

$$40. \frac{4}{9}x^2y^2 - \frac{1}{4} = \frac{16}{36}x^2y^2 - \frac{9}{36} = \frac{1}{36}(16x^2y^2 - 9) = \frac{1}{36}(4xy+3)(4xy-3)$$

$$41. \frac{25}{16}a^3x^4 - \frac{4}{9}ay^2 = \frac{225}{144}a^3x^4 - \frac{64}{144}ay^2 = \frac{1}{144}a(225a^2x^4 - 64y^2) = \frac{1}{144}a(15ax^2 + 8y)(15ax^2 - 8y)$$

$$42. \frac{9}{4}m^2x^2 - \frac{25}{36}n^2y^2 = \frac{81}{36}m^2x^2 - \frac{25}{36}n^2y^2 = \frac{1}{36}(81m^2x^2 - 25n^2y^2) = \frac{1}{36}(9mx + 5ny)(9mx - 5ny)$$

$$43. (x-2)^2 - 36 = [(x-2)+6][(x-2)-6]$$

$$44. (3x-5)^2 - 81 = [(3x-5)+9][(3x-5)-9]$$

$$45. 169 - (x-y)^2 = -1[(x-y)^2 - 169] = -1[(x-y)+13][(x-y)-13]$$

$$46. (5x+1)^4 - 49 = [(5x+1)^2 + 7][(5x+1)^2 - 7]$$

$$47. (x-y)^2 - (x+y)^2 = [(x-y) + (x+y)][(x-y) - (x+y)]$$

$$48. (3x+1)^6 - (y-3)^4 = [(3x+1)^3 + (y-3)^2][(3x+1)^3 - (y-3)^2]$$