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

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

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

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

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

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

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

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