Factorisation - Lesson 4

Factorising a Difference of Two Squares
(1 Letter - No Common Factor)

<u>LI</u>

- Factorise expressions of the form $x^2 - y^2$.

<u>SC</u>

- Do the opposite of expanding the brackets $(x + y)(x - y)$.

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<u>Lead in to the Main Result</u>

$$(x + y)(x - y)$$

$$= x^2 - xy + xy - y^2$$

$$= x^2 - y^2$$

So - Main Result (Difference of Two Squares) :

$$x^2 - y^2 = (x + y)(x - y)$$

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Some Useful Reminders

$$\sqrt{x^2} = x$$

$$\sqrt{3^2} = 3$$

$$\sqrt{9x^2} = 3x$$

$$\sqrt{25y^2} = 5y$$

$$\sqrt{\frac{1}{4}} = \frac{1}{2}$$

Method for factorising a difference of 2 squares :

- Take the square root of each term.
- Write a pair of brackets, 1 with +, the other −.
- Write the answers to the square roots in each bracket **in the same order** that they appear in the question.

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Example 1

$$x^2 - 16$$

$$= \boxed{(x + 4)(x - 4)}$$

Example 2

$$64 - r^2$$

$$= \boxed{(8 + r)(8 - r)}$$

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Example 3

$$x^2 - 1/4$$

$$= \boxed{(x + 1/2)(x - 1/2)}$$

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1. $x^2 - 16$	2. $y^2 - 49$	3. $z^2 - 81$
4. $p^2 - 64$	5. $q^2 - 36$	6. $r^2 - 4$
7. $a^2 - 100$	8. $b^2 - 144$	9. $c^2 - 121$
10. $m^2 - 400$	11. $n^2 - 900$	12. $u^2 - 2500$
13. $v^2 - 1600$	14. $x^2 - 3600$	15. $y^2 - 225$
16. $z^2 - 625$	17. $a^2 - \frac{1}{4}$	18. $b^2 - \frac{1}{9}$
19. $c^2 - \frac{1}{25}$	20. $m^2 - \frac{1}{16}$	21. $n^2 - \frac{1}{100}$
22. $u^2 - \frac{1}{36}$	23. $v^2 - \frac{1}{64}$	24. $r^2 - \frac{1}{81}$
25. $s^2 - \frac{1}{49}$	26. $9 - a^2$	27. $25 - b^2$
28. $16 - c^2$	29. $4 - d^2$	30. $64 - m^2$
31. $36 - n^2$	32. $81 - p^2$	33. $1 - q^2$
34. $100 - r^2$	35. $144 - s^2$	36. $121 - t^2$
37. $900 - x^2$	38. $400 - y^2$	39. $1600 - z^2$
40. $2500 - a^2$	41. $6400 - b^2$	42. $4900 - c^2$
43. $225 - d^2$	44. $\frac{1}{25} - u^2$	45. $\frac{1}{100} - v^2$
46. $\frac{1}{9} - m^2$	47. $\frac{1}{16} - n^2$	48. $\frac{1}{4} - x^2$
49. $\frac{1}{36} - y^2$	50. $\frac{1}{144} - z^2$	

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Answers

1. $x^2 - 16$ (x + 4)(x – 4)   2. $y^2 - 49$(y + 7)(y – 7)   3. $z^2 - 81$(z + 9)(z – 9)

4. $p^2 - 64$ (p + 8)(p – 8)   5. $q^2 - 36$(q + 6)(q – 6)   6. $r^2 - 4$ (r + 2)(r – 2)

7. $a^2 - 100$ (a + 10)(a – 10)   8. $b^2 - 144$(b + 12)(b – 12)   9. $c^2 - 121$(c + 11)(c – 11)

10. $m^2 - 400$(m + 20)(m – 20)   11. $n^2 - 900$(n + 30)(n – 30)   12. $u^2 - 2500$(u + 50)(u – 50)

13. $v^2 - 1600$(v + 40)(v – 40)   14. $x^2 - 3600$(x + 60)(x – 60)   15. $y^2 - 225$(y + 15)(y – 15)

16. $z^2 - 625$(z + 25)(z – 25)   17. $a^2 - \frac{1}{4}$(a + 1/2)(a – 1/2)   18. $b^2 - \frac{1}{9}$(b + 1/3)(b – 1/3)

19. $c^2 - \frac{1}{25}$(c + 1/5)(c – 1/5)   20. $m^2 - \frac{1}{16}$(m + 1/4)(m – 1/4)   21. $n^2 - \frac{1}{100}$(n + 1/10)(n – 1/10)

22. $u^2 - \frac{1}{36}$(u + 1/6)(u – 1/6)   23. $v^2 - \frac{1}{64}$(v + 1/8)(v – 1/8)   24. $r^2 - \frac{1}{81}$(r + 1/9)(r – 1/9)

25. $s^2 - \frac{1}{49}$(s + 1/7)(s – 1/7)   26. $9 - a^2$(3 + a)(3 – a)   27. $25 - b^2$(5 + b)(5 – b)

28. $16 - c^2$(4 + c)(4 – c)   29. $4 - d^2$(2 + d)(2 – d)   30. $64 - m^2$(8 + m)(8 – m)

31. $36 - n^2$(6 + n)(6 – n)   32. $81 - p^2$(9 + p)(9 – p)   33. $1 - q^2$(1 + q)(1 – q)

34. $100 - r^2$(10 + r)(10 – r)   35. $144 - s^2$(12 + s)(12 – s)   36. $121 - t^2$(11 + t)(11 – t)

37. $900 - x^2$(30 + x)(30 – x)   38. $400 - y^2$(20 + y)(20 – y)   39. $1600 - z^2$(40 + z)(40 – z)

40. $2500 - a^2$(50 + a)(50 – a)   41. $6400 - b^2$(80 + b)(80 – b)   42. $4900 - c^2$(70 + c)(70 – c)

43. $225 - d^2$(15 + d)(15 – d)   44. $\frac{1}{25} - u^2$(1/5 + u)(1/5 – u)   45. $\frac{1}{100} - v^2$(1/10 + v)(1/10 – v)

46. $\frac{1}{9} - m^2$(1/3 + m)(1/3 – m)   47. $\frac{1}{16} - n^2$(1/4 + n)(1/4 – n)   48. $\frac{1}{4} - x^2$(1/2 + x)(1/2 – x)

49. $\frac{1}{36} - y^2$(1/6 + y)(1/6 – y)   50. $\frac{1}{144} - z^2$(1/12 + z)(1/12 – z)

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