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EB Education Revision Guide

How to work with Algebra: Part 3

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What you need to know about Algebra: Part 3

Including:

Factorising

Single brackets

Difference of 2 squares

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Factorising: Single brackets

How to do it:

Factorising means putting back into brackets.

You need to:

- Find the biggest number that goes into all the terms (the highest common factor).
- Look at each letter in turn – and take out the highest power that goes into all the terms.
- Put these outside the brackets.
- Put inside the brackets what you need to multiply by what is outside the brackets to get the original term.
- Check your answer is correct by multiplying out the brackets to get the original expression.

Example

Factorise $8a^2 + 12a$

The HCF of 8 and 12 is 4

The HCF of a^2 and a *is* a

Put 4 and a outside the brackets

$4a(2a + 3)$

To get $8a^2$ you need to multiply 4a by 2a

To get 12a you need to multiply 4a by 3

$4a(2a + 3)$

$(4a \times 2a) + (4a \times 3) = 8a^2 + 12a$

Check your answer by expanding the brackets

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Factorising: Single brackets

Example 2:

Factorise $15a^3y - 3a^2y^2$

The HCF of 15 and 3 is 3
The HCF of a^3 and a^2 is a^2
The HCF of y and y^2 is y

Put 3 and a^2 and y outside the brackets

$$3a^2y(5a^2 - y)$$

To get $15a^3y$ you need to multiply $3a^2y$ by $5a^2$

To get $3a^2y^2$ you need to multiply $3a^2y$ by y

Check your answer by expanding the brackets.

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Factorising: The Difference of Two Squares

How to do it:

$$a^2 - b^2 = (a + b)(a - b)$$

The answer will always be in this format.

In all the examples that will factorise, you have x^2 minus a square number.

Sometimes it will be easy to spot it is the difference of two squares, as you will see both terms are square numbers.

Other times you may need to factorise first – then complete a difference of two squares.

You may also find the difference of two squares on the top or bottom of algebraic fractions.

Examples:

$a^2 - 36$

$(a + 6)(a - 6)$

$a^2 - 49$

$(a + 7)(a - 7)$

$4n^2 – 49$

$(2n + 7)(2n – 7)$

$20a^2 – 45$

$5(4a^2 – 9)$ Factorise first

$5(2a + 3)(2a-3)$ Complete difference of 2 squares

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Your turn:

Set 1:

1. $2b + 10$
2. $4p - 16$
3. $15w + 6$
4. $6y + 36$
5. $8a + 24$
6. $18b - 9$

Set 2:

1. $b^2 + 4b$
2. $6p^2 – 5p$
3. $4a^2 + 13a$
4. $w^3 - 4w^2$
5. $d^3 + 3d^2$
6. $17f^2 + f$

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Your turn:

Set 3:

1. $4a^2 + 8a$
2. $24y^3 + 30y$
3. $10p + 15p^3$
4. $18d^3 – 3d$
5. $10f^3 – 35f^2$
6. $28y^3 – 7y$

Set 4:

1. $a^2 - 9$
2. $y^2 - 64$
3. $4p^2 - 25$
4. $2d^2 – 18$
5. $150f^2 – 216$
6. $196y^2 – 144$

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Answers:

Set 1:

1. $2(b + 5)$
2. $4(p – 4)$
3. $3(5w + 2)$
4. $6(y + 6)$
5. $8(a + 3)$
6. $9(2b - 1)$

Set 2:

1. $b(b + 4)$
2. $p(6p – 5)$
3. $a(4a + 13)$
4. $w^2(w - 4)$
5. $d^2(d+ 3)$
6. $f(17f + 1)$

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Answers:

Set 3:

1. $4a(a + 2)$
2. $6y(4y^2 + 5)$
3. $5p(2 + 3p^2)$
4. $3d(6d^2 – 1)$
5. $5f^2(2f – 7)$
6. $7y(4y^2 – 1)$

Set 4:

1. $(a + 3)(a – 3)$
2. $(y + 8)(y – 8)$
3. $(2p + 5)(2p – 5)$
4. Factorise first $2(d^2 – 9)$
   Difference of 2 squares $2(d +3)(d - 3)$
5. Factorise first $6(25f^2 - 36)$
   Difference of 2 squares $6 (5f + 6) (5f – 6)$
6. $(14y + 12) (14y – 12)$

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For more help and resources, or to work with us as a tutor, please contact us

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