

GCSE & High School Topic Questions

Factorization

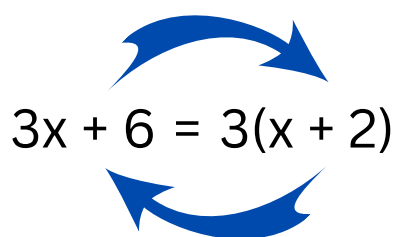
Factorizing is the reverse process of expanding brackets.

To factorize an algebraic expression means to put it in brackets by taking out the common factors.

(a) Factorizing single bracket

Example 1 Factorize: $3x + 6$

Factorization

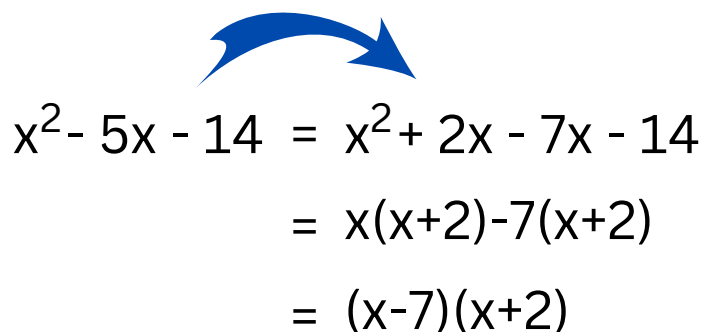

$$3x + 6 = 3(x + 2)$$

Expanding brackets

(b) Factorizing double brackets

Example 2 Factorize: $x^2 - 5x - 14$

Factorization


$$\begin{aligned}x^2 - 5x - 14 &= x^2 + 2x - 7x - 14 \\&= x(x+2) - 7(x+2) \\&= (x-7)(x+2)\end{aligned}$$

Expanding brackets

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(c): Differences of two squares

Example 3

Factorize: $121 - 4y^2$

Factorization



$$121 - 4y^2 = (11)^2 - (2y)^2$$

$$= (11+2y)(11-2y)$$



Expanding brackets

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Factorization

(1) Factorize $x^2 - 8x + 7$

(2 marks)

(2) Factorize $x^2 + 4x - 21$

(2 marks)

(3) Factorize $a^2 - 11a + 18$

(2 marks)

(4) Factorize $x^2 + 9x + 20$

(2 marks)

(5) Factorize $x^2 - 49$

(2 marks)

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(6) Factorize $m^2 - 9n^2$

(2 marks)

(7) Factorize $p^2 + p - 6$

(2 marks)

(8) Factorize $36x^3 + 18x$

(2 marks)

(9) Factorize $50a^2 + 70ab$

(2 marks)

(10) Factorize $6w^2 - 7w - 10$

(2 marks)

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Factorization

answers

(1) Factorize $x^2 - 8x + 7$

Solution:

$$\begin{aligned}x^2 - 8x + 7 &= x^2 - x - 7x + 7 \\&= x(x-1) - 7(x-1) \\&= (x-1)(x-7)\end{aligned}$$

(2) Factorize $x^2 + 4x - 21$

Solution:

$$\begin{aligned}x^2 + 4x - 21 &= x^2 - 3x + 7x - 21 \\&= x(x-3) + 7(x-3) \\&= (x-3)(x+7)\end{aligned}$$

(3) Factorize $a^2 - 11a + 18$

Solution:

$$\begin{aligned}a^2 - 11a + 18 &= a^2 - 2a - 9a + 18 \\&= a(a-2) - 9(a-2) \\&= (a-2)(a-9)\end{aligned}$$

(4) Factorize $x^2 + 9x + 20$

Solution:

$$\begin{aligned}x^2 + 9x + 20 &= x^2 + 4x + 5x + 20 \\&= x(x+4) + 5(x+4) \\&= (x+4)(x+5)\end{aligned}$$

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answers

(5) Factorize $x^2 - 49$

Solution:

$$\begin{aligned}x^2 - 49 &= (x)^2 - (7)^2 \\ &= (x+7)(x-7)\end{aligned}$$

(6) Factorize $m^2 - 9n^2$

Solution:

$$\begin{aligned}m^2 - 9n^2 &= (m)^2 - (3n)^2 \\ &= (m+3n)(m-3n)\end{aligned}$$

(7) Factorize $p^2 + p - 6$

Solution:

$$\begin{aligned}p^2 + p - 6 &= p^2 + 3p - 2p - 6 \\ &= p(p+3) - 2(p+3) \\ &= (p+3)(p-2)\end{aligned}$$

(8) Factorize $36x^3 + 18x$

Solution:

$$36x^3 + 18x = 6x(6x^2 + 3)$$

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(9) Factorize $50a^2 + 70ab$

Solution:

$$50a^2 + 70ab = 10a(5a + 7b)$$

(10) Factorize $6w^2 - 7w - 10$

Solution:

$$\begin{aligned} 6w^2 - 7w - 10 &= 6w^2 - 12w + 5w - 10 \\ &= 6w(w - 2) + 5(w - 2) \\ &= (6w + 5)(w - 2) \end{aligned}$$