ALGEBRAIC EXPRESSIONS: PRODUCTS & FACTORS

3 FEBRUARY 2014

Lesson Description

In this lesson we:

- Revise how to find products and factors

Summary

Terminology

Monomial - an algebraic expression with just one term

Binomial - an algebraic expression with two terms

Trinomial - an algebraic expression with three terms

What is a factor?

2(3) =6
Factors of six are two and three

Distributive law:

p(a+b) = pa+pb

Factors of p(a+b) are p and (a+b)

Difference of two squares: $x^2 - y^2 = (x + y)(x - y)$
Difference of two cubes: $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$
Sum of two cubes: $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$

Products

Product of a binomial multiplied by a binomial

Example: Simplify (3x+2y)(x-y)

Method 1
By the distributive law:
(3x+2y)(x-y) = 3x(x-y) +2y(x-y)

Method 2
FOIL: (3x+2y)(x-y) = 3x.x -3xy+ 2xy -$2y^2$

Test Yourself

Question 1

Which expression has a lowest common factor of $2x$?

A $2x + 4$
B $2x^2 + 8x$
C $4x - 4$
D $8x^2 + 4xy$

Question 2

Which expression is a difference of two squares?

A $2x - 4$
B $3x^2 - 9y^2$
C $4x^2 - 4$
D $9x^2 - 16xy$

Question 3

What is a factor of $16x^2 - 25y^2$

A $4x + 5y$
B $5y$
C $x - y$
D $(4x - 5y)(4x + 5y)$

Question 4

What are the factors of $8x^3 - 64y^3$?

A $2x - 4y$
B $x - 2y$
C $x^2 - 2xy - 4y^2$
D $x^2 - 2xy + 4y^2$

Question 5

The factors of $x^2 - 5x - 6$ are:

A $(x + 1)$ and $(x - 6)$
B $(x - 1)$ and $(x + 6)$
C $(x - 2)$ and $(x - 3)$
D $(x - 2)$ and $(x + 3)$

Question 6

The product of $(2x - 1)(3x - 4)$

A $6x^2 - 11x + 4$
B $6x^2 - 11x - 4$
C $6x^2 - 7x + 4$
D $6x^2 - 8x - 4$

Question 7

State whether the following are true or false:

a.) The factors of $3n^2 - 20n + 20$ are $(3n - 1)(n - 20)$

b.) $8m^3 - 216n^3$ is a difference of two cubes

c.) The factors of $6x^4 - 13x^3 + 5x^2$ are $x^2(2x - 1)(3x - 5)$

d.) $x^3 + y^3 = (x + y)(x^2 + xy + y^2)$

Improve your Skills

Question 1

Find the products of:

a.) $(2a^2 - b)(3a^2 + 2b)$

b.) $(\frac{1}{2}x - \frac{1}{2}y)(\frac{1}{2}x + \frac{1}{2}y)$

Question 2

Find the product of $(2a - b)^2$

Question 3

Simplify:

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

b.) $(2a - 3b)(4a^2 + 6ab + 9b^2)$

Question 4

Factorise the following:

a.) $-3x+15y$

b.) $2a(p+q) - b(p+q)$

c.) $2a^2(x-y) - a(y-x)$

d.) $2x^4-32$

e.) $9a^2-6ab+b^2$

f.) $125y^3 + 8$