

KEY POINTS

Section 2.3 Expanding & Factoring

- Expanding using the distributive law
- Factoring quadratic expressions
- Perfect Squares
- Difference of squares

Warm-Up

Section 2.3

Expanding &
Factoring

Simplify the following equations.

1. $2x^4 - 3x + 5 + 4x^4 + 6x^2 - 5x$

2. $(3x^2 + 4x - 3) - (5x^2 + 9x - 4)$

Background

Section 2.3 Expanding & Factoring

There are many situations where we will expand mathematical situations and then combine like terms.

Given the following equation how would you simplify it?

$$(z - 4)(z - 2)$$

Background

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Factoring

One way to simplify it is by using the distributive law.

$$(z - 4)(z - 2)$$

Try It!

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$$(3x - 2)(2x + 3)$$

Try It!

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$$(w - 9)^2$$

Background

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Using the distributive law is one way to simplify our mathematical situations, however there are other ways to simplify that may make more sense to you. Let's do the rectangle diagram.

$$(z - 4)(z - 2)$$

Try It!

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$$(3x - 2)(2x + 3)$$

Background

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We also have a method known as the foil method.

$$(z - 4)(z - 2)$$

Try it!

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$$(w - 9)^2$$

Try it!

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Pick one of the methods we used to combine like terms and simplify.

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

Warm-Up

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Simplify the following expression

1. $(2x + 3y)^2$

Background

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FACTORING QUADRATIC EXPRESSIONS

If a quadratic expression is factorable, the following steps work:

- Factor out all common constant factors, giving $k(ax^2+bx+c)$
- In the remaining expression, multiply the coefficient of the x^2 term by the constant term ac .
- Find two numbers that multiply to ac and sum to b , the coefficient of the x term
- Break the middle term, bx , into two terms using the result of the previous step
- Factor the four terms by grouping

Background

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Expanding & Factoring

In the first part of our lesson we were working with equations that were in factored form and changed them to general form. Now we are going to work backwards.

If possible, factor into $(x + r)(x + s)$, where r and s are integers.

We are given an equation: $x^2 - 6x - 27$

Try it!

We are given an equation: $x^2 - 9x + 18$

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Try it!

We are given an equation: $y^2 - 13y + 36$

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Try it!

We are given an equation: $x^2 + 10xy + 24y^2$

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Another Issue

WHAT IF THE COEFFICIENT OF x^2 IS NOT 1?

$$2x^2 + 7x + 3$$

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Try it!

We are given an equation: $2x^2 + x - 6$

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Try it!

We are given an equation: $8x^2 + 14x - 15$

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Try it!

We are given an equation: $12x^2 - 44x + 24$

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Background

There are also so special rules that we can use, that don't require a lot of manipulation.

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Perfect Squares

$$(x + r)^2 = x^2 + 2xr + r^2$$

$$(x - r)^2 = x^2 - 2xr + r^2$$

Difference of Squares

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

Background

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Perfect Squares

An expression with three terms is a PERFECT SQUARE if:

- Two of the terms are squares, and
- The third term is twice the product of the expressions whose squares are the other terms

Difference of Squares

If an expression is in the form $x^2 - r^2$, it can be factored as:

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

Try it!

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$$z^2 - 225$$

$$(x + 14)^2$$

$$(x - 14)^2$$

Try it!

$$49y^2 + 25$$

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$$x^2 - 100$$

Try it!

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$$4r^2 + 10r + 25$$

$$9p^2 + 60p + 100q^2$$

$$25y^2 - 30yz + 9z^2$$

Homework

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Pages 45-46
#2-24 even, 27-57 odd

