

ACCUPLACER PREP

Elementary Algebra

SECTION 2

- *Basic Operations with Polynomials*
- *Factoring Polynomials*

General Information

- About 12 questions
- Calculator for some problems
→ will pop up on screen when allowed
- Untimed

Basic Operations with Polynomials

Add—vertical method

$$(3x^2 + 7x - 9) + (5x^2 - 6x + 3)$$

$$\begin{array}{r} 3x^2 + 7x - 9 \\ + 5x^2 - 6x + 3 \\ \hline 8x^2 + 1x - 6 \end{array}$$



$$8x^2 + x - 6$$

Add—horizontal method

$$(-7y^2 + 6y - 2) + (y^2 - 3y + 11)$$

$$-6y^2 + 3y + 9$$



$$-6y^2 + 3y + 9$$

Subtract—vertical method

$$(8a^2 - 4a - 1) - (10a^2 + 5)$$

$$\begin{array}{r} 8a^2 - 4a - 1 \\ - 10a^2 \quad + 5 \\ \hline -2a^2 - 4a - 6 \end{array}$$



$$-2a^2 - 4a - 6$$

Subtract—horizontal method

$$(-5c^2 + 8) - (2c^2 + 5c - 7)$$

$$\color{red}{-5c^2} + \color{green}{8} - \color{red}{2c^2} - \color{blue}{5c} + \color{green}{7}$$

$$-7c^2 - 5c + 15$$

When subtracting polynomials horizontally, it is important to distribute the subtraction sign BEFORE combining like terms



$$-7c^2 - 5c + 15$$

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

$$15x^2 + 20x - 45$$

Use the
Distributive
Property

$$3y(2y^2 - 7y + 1)$$

$$\color{red}{6y^3} - \color{green}{21y^2} + \color{blue}{3y}$$



LET'S TRY SOME...

$$ab(3a^2 + 8a^2b - 2b^3)$$

$$\color{red}{3a^3b} + \color{red}{8a^3b^2} - \color{red}{2ab^3}$$

$$-3m^2(4m^4 - 7n^3 - 5mn^2)$$

$$\color{red}{-12m^6} + \color{red}{21m^2n^3} + \color{red}{15m^3n^2}$$

FOIL

the acronym used to help us remember the order in which we multiply the terms when multiplying two binomials.

First

Outer

Inner

Last

$$(a + b)(c + d)$$

Example

$$(x + 7)(2x + 4)$$

$$\color{red}{2x^2} + \color{green}{4x} + \color{blue}{14x} + \color{red}{28}$$

$$\color{red}{2x^2} + \color{green}{18x} + \color{red}{28}$$

First, follow
the steps of
FOIL

Next,
combine your
like terms

Now you try...

$$(7x - 8)(x - 4) \quad \color{red}{7x^2 - 36x + 32}$$

$$(c + 3)(c - 6) \quad \color{red}{c^2 - 3c - 18}$$

Factoring Polynomials

GCF: GREATEST COMMON FACTOR

to determine the greatest common factor of the variable part of a polynomial:

- find a variable that is common in ALL terms
- keep the lowest exponent of the variable

Example

$$10x^3 - 4x^2$$

$$2x^2(5x - 2)$$

What is common in both terms?
2 and x

What times $2x^2$ is $10x^3$?

What times $2x^2$ is $-4x^2$?

Factor out a 2.

When factoring out the x, keep the lowest exponent.

Factor out the GCF.

$$6x^2 + 9x$$

Determine the GCF of the coefficients.

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

Pull out the LOWEST exponent of each common variable factor.



What about this one?

How many terms are there?

$$x(x + 2) + 5(x + 2)$$

What is common in both terms?

$$(x + 2)(x + 5)$$

Pull it out front.

Write the leftover terms in another set of parentheses.

Factoring by Grouping

When there are 4 terms, group the first two terms and the last two terms.

$$pq + 5q + 2p + 10$$

$$q(p + 5) + 2(p + 5)$$

For each set of 2 terms, factor out the GCF

$$(p + 5)(q + 2)$$

Now look at these two terms—and pull out the GCF of them.

And write the "leftovers" in a second set of parentheses.



Steps for Factoring Trinomials

(with a leading coefficient of 1)

Start by making your two sets of parentheses.

$$x^2 + 8x + 12$$

Put an x in the beginning of each.

$$(x + 6)(x + 2)$$

Find 2 numbers that multiply to 12 but add to 8.

$$x^2 - 5x + 6$$

Start by making your two sets of parentheses.

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

Put an x in the beginning of each.

Find 2 numbers that multiply to 6 but add to -5.

What's Different with this one?

$$5x^2 - 35x + 60$$

Factor out the GCF first.

$$5(x^2 - 7x + 12)$$

Next, factor the trinomial—remember to keep the 5 in front.

$$5(x-3)(x-4)$$

Find two numbers that multiply to +12 but add to -7.

Factoring—leading coefficient not 1

Grouping Method

Multiply the leading coefficient with the constant $3 \times 1 = 3$

$$3p^2 - 4p + 1$$

Find two numbers that multiply to 3 but add to -4

$$3p^2 - 3p - 1p + 1$$

$$3p(p-1) - 1(p-1)$$

Re-write the trinomial as 4 terms

$$(p-1)(3p-1)$$

Factor by grouping

Factoring—leading coefficient not 1

Grouping Method

Multiply the leading coefficient with the constant $12 \times -3 = -36$

$$12x^2 - 16x - 3$$

Find two numbers that multiply to -36 but add to -16

$$12x^2 - 18x + 2x - 3$$

$$6x(2x - 3) + 1(2x - 3)$$

Re-write the trinomial as 4 terms

$$(2x - 3)(6x + 1)$$

Factor by grouping

Is this all I need to know about factoring?

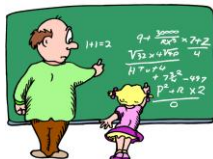
No!

Come to the
ACADEMIC
SERVICES LAB for
more practice!



RESOURCES:

Go to your nearest Academic Services Lab and you can get a packet of practice problems. You can also work with an instructor!



ONLINE RESOURCES:

<http://www.purplemath.com/>

"Accuplacer Math" can be found on the right side of the screen

<http://accuplacerpractice.collegeboard.org/>

need to create an account but appears to be free

