

Factoring Quadratics

MGSE9-12.A.REI.4 Solve quadratic equations in one variable.

MGSE9-12.A.REI.4b Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, factoring, completing the square, and the quadratic formula, as appropriate to the initial form of the equation (limit to real number solutions). Build a function that models a relationship between two quantities.

Vocabulary

Factoring - Separating an expression into its simplest terms or expressions that have been multiplied together

Greatest Common Factor - the largest number or term that divides evenly into each term of an expression.

Relatively Prime - an expression or set of terms where the greatest common factor is 1.

What am I learning today?

How to factor the GCF from a polynomial

How will I show that I learned it?

Find the GCF and factor it out of a trinomial expression

Factoring Polynomials

- Should be put in Standard Form.

- You are "undoing" multiplication $x^2 + x + 3$

- LOTS of different patterns and methods

- You can ALWAYS check your work by multiplying.

GCF - the Greatest Common Factor is the largest number with the largest variable that divides evenly into ALL terms.

Ex. A) $\frac{21x}{7}, \frac{28}{7}$ GCF: 7

Ex. B) $10x^4, 25x^2$ GCF: $5x^2$
 x^2 lowest power

Ex. C) $12x^3, 35$ GCF: _____
except +1 Relatively Prime

Ex. D) $\frac{8x^5}{2x^3}, \frac{24x^4}{2x^3}, \frac{2x^3}{2x^3}$ GCF: $2x^3$

How did we **distribute**?

$$1. 7(3x + 4) = 21x + 28$$

$$2. 10x(4x - 1) = 40x^2 - 10x$$

$$3. -2(16x^2 + 9) = -32x^2 - 18$$

Factoring is the **OPPOSITE!** We are **UNDOING** what was multiplied.

Factoring GCF - divide out the largest number with the largest variable that divides evenly into ALL terms.

Ex. A

$$\frac{21x}{7} + \frac{28}{7} = \overline{7} (3x + 4)$$

(Handwritten annotations: Blue arrows point from 'GCF: 7' to the 7s in the fractions. A red arrow points from 'GCF' to the 7 in the factored form.)

Ex. B $\frac{40x^2}{10x} - \frac{10x}{10x} = \boxed{10x(4x-1)}$

GCF: 10x

↑
GCF

$$\frac{10}{10} = 1 \quad \frac{x}{x} = 1$$

If the leading coefficient is NEGATIVE, the GCF is also NEGATIVE.

Ex. C $\frac{-32x^2}{-2} - \frac{18}{-2} = \boxed{-2(16x^2 + 9)}$
GCF: -2

Ex. D $\frac{-12x^2}{-6x} + \frac{18x}{-6x} = -6x(2x - 3)$
GCF: $-6x$

Ex. E $28x + 42x^2 + 14$

$$\frac{42x^2}{7} + \frac{28x}{7} + \frac{14}{7} \quad \text{S.F.}$$
$$= 7(x^2 + 4x + 2)$$

Ex. F $9x^2 + 20$

Ex. G $4x^2y + 10xy$

Ex. H $12x + 9 - 3x^2$