Objective: Factor binomials completely.

Concept

To Factor Binomials Completely

1. Factor out any GCF.
2. Determine if the binomial is a difference of two squares. If so, factor into a product of conjugate binomials.
   Difference of Two Squares: $(a)^2 - (b)^2$
3. Write the complete product of factors, including any GCF

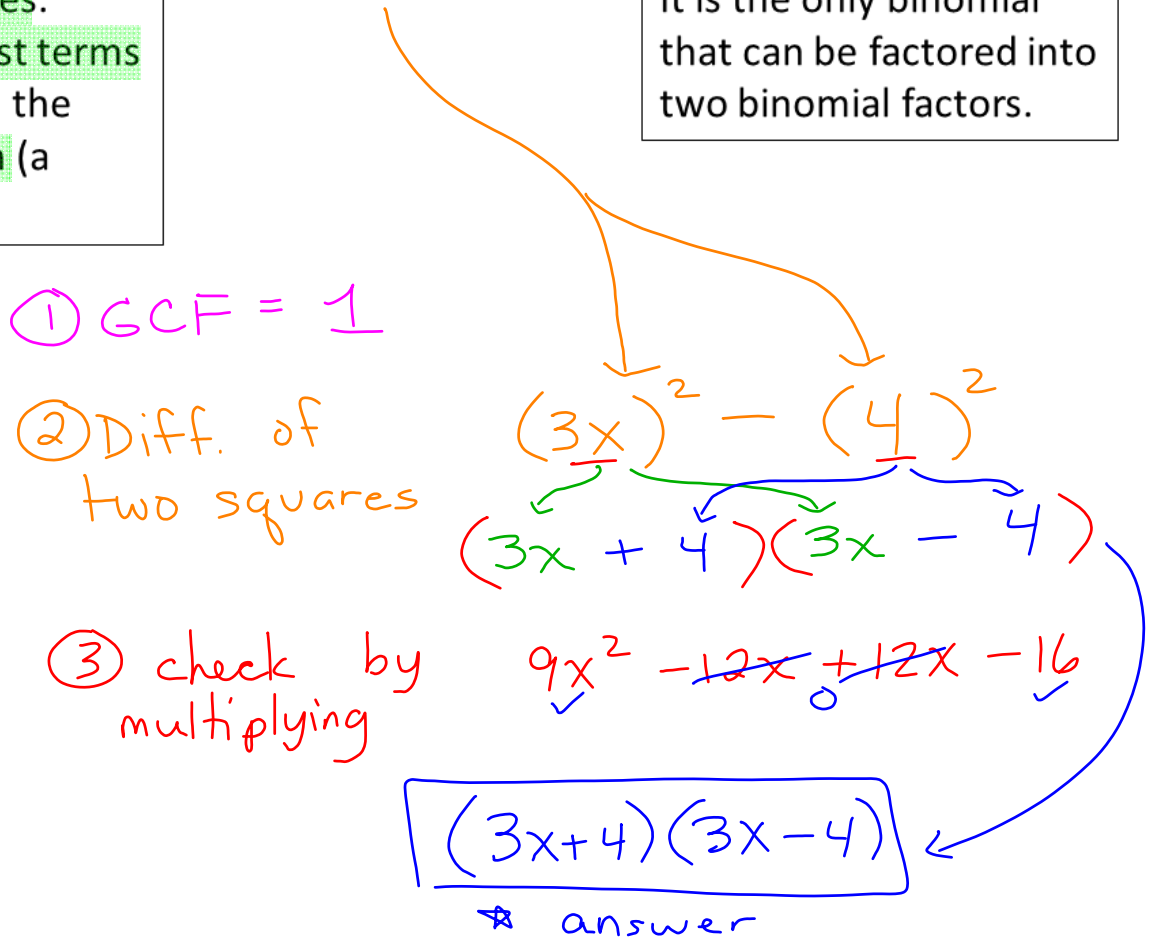
Objective: Factor binomials completely.

Ex) Factor each binomial completely. If the binomial cannot be factored, write *prime*.

This binomial is called a difference of two squares. Because the first and last terms are perfect squares and the operation is subtraction (a difference).

$$9x^2 - 16$$

This binomial is special. It is the only binomial that can be factored into two binomial factors.



Objective: Factor binomials completely.

Ex) Factor each binomial completely. If the binomial cannot be factored, write *prime*.

$$3x^3 - 27x$$

① GCF = $3x$

$3x(x^2 - 9)$

② Diff. of two squares

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

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

$x^2 - 3x + 3x - 9$

0

③ check by mult. the binomials

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

★ answer

Objective: Factor binomials completely.

Ex) Factor each binomial completely. If the binomial cannot be factored, write *prime*.

$$-2x^2 + 18x$$

① GCF
$= -2x$

$-2x(x - 9)$

② not a diff. of two squares

$-2x(x-9)$

★ answer

Objective: Factor binomials completely.

Ex) Factor each binomial completely. If the binomial cannot be factored, write *prime*.

sum

$x^2 + 36$

① GCF = 1

② not a diff. of two squares

prime

* answer

Objective: Factor binomials completely.

Ex) Factor each binomial completely. If the binomial cannot be factored, write *prime*.

$$5x^2 + 20$$

① GCF = 5

$5(x^2 + 4)$ — sum

② not a diff. of two squares

$5(x^2 + 4)$

★ answer

Objective: Factor binomials completely.

Closure

Three students factored the binomial below. Which student is correct? Explain.

$$x^2 + 81$$

Student A	Student B	Student C
$(x+9)^2$	prime	$(x+9)(x-9)$

Student B is correct because $x^2 + 81$ is a sum of two squares with a GCF of 1, so it cannot be factored.

Objective: Factor binomials completely.

Closure

Three students factored the binomial below. Which student is correct? Explain.

$$2x^3 - 50x$$

Student A	Student B	Student C
$(x-5)(x+5)$	$2x(x-5)^2$	$2x(x-5)(x+5)$

Student C is correct. The GCF is $2x$, giving $2x(x^2 - 25)$, and then $x^2 - 25$ is a difference of two squares and can be factored into $(x + 5)(x - 5)$.