In Your Head

M10 - 5.0 - Factoring Review

Don't Forget To Check By Distribution/FOIL

Remove Greatest Common Factor "GCF."

Or Substitution!

Factoring: $bx + c$

$12x + 8$ $\quad GCF = 4$ $\quad \frac{8}{4} = 2$

$4(3x + 2)$ ✓

$12x^2 + 8x$ $\quad GCF = 4x$

$4x(3x + 2)$

$-2x + 8$ $\quad GCF = -2$

$-2(x - 4)$

a b c

$2x^2 + 7x + 6$

"a" is the number in front of the x^2 term.
"b" is the number in front of the x term.
"c" is the number by itself.

Factoring: $ax^2 + bx + c$

$x^2 + 5x + 6$ $\quad a = 1$

$(x+2)(x+3)$ ✓

$* ac = c$

$2 \times 3 = \cancel{c}\ 6$

$2 + 3 = \cancel{b}\ 5$

List them!

1,6
2,3

Decomposition

$x^2+5x + 6$

$x^2 + 2x + 3x + 6$
$(x^2 + 2x)|(+3x + 6)$
$x(x + 2) + 3(x + 2)$
$(x+2)(x+3)$

Factoring: $ax^2 + bx + c$

$2x^2 + 7x + 6$ $\quad a \neq 1$

$2x^2+3x + 4x + 6$
$(2x^2+3x)|(+ 4x + 6)$
$x(2x + 3) + 2(2x + 3)$
$(x + 2)(2x + 3)$

Decompose
Group
GCF
GCF

ac

$3 \times 4 = \cancel{ac}\ 12$

$3 + 4 = \cancel{b}\ 7$

Quick Method

$2x^2 + 7x + 6$
$(x+\ \ )(2x\ \ )$
$(x + 2)(2x + 3)$

Hack Method

$2x^2 + 7x + 6$
$(2x + 4)(2x + 3)$
$\div 2$
$(x + 2)(2x + 3)$

$x^2 + 5x + 8$ Cannot Factor

Factoring: $a^2 - b^2$

Differences of Squares

$x^2 - 9$

$(x + 3)(x - 3)$ ✓

$9 = 3^2$

$a^2 - b^2 = (a + b)(a - b)$
$= a^2 - \cancel{ab} + \cancel{ab} - b^2$

$4x^2 - 9y^2$

$(2x + 3y)(2x - 3y)$ ✓

$4x^2 = (2x)^2$
$9y^2 = (3y)^2$

$x^2 + 9$ Cannot Factor

Factoring : $ax^2 + bxy + cy^2$

$x^2 + 5xy + 6y^2$

$(x + 2y)(x + 3y)$ ✓

Perfect Squares

$4x^2 - 20x + 25$
$(2x - 5)(2x - 5)$
$(2x - 5)^2$ ✓

$(\sqrt{a}x \pm \sqrt{c})^2$

$\pm\sqrt{4} \times \sqrt{25} \times 2 = \pm 20$

Perfect Square

$\sqrt{a} \times \sqrt{c} \times 2 = b$
$2\sqrt{ac} = b$
$b^2 - 4ac = 0$

Factoring Special Trinomials

$9 - x^2 - 2x - 1$
$9 - (x^2 + 2x + 1)$ $\quad Group/GCF = -1$
Partial Factor
$9 - (x + 1)^2$
$9 - m^2$

Substitution: $m = x + 1$

$(3 - m)(3 + m)$
$(3 - (x + 1))(3 + (x + 1)$
$(3 - x - 1)(3 + x + 1)$
$(-x + 2)(x + 4)$
$-(x - 2)(x + 4)$ ✓