8-4 Factoring Polynomials of the Form $ax^2 + bx + c$

- Factoring polynomials when...

The degree is 2 (quadratic).
the number of terms is 3 (trinomial).
* The leading coefficient is NOT 1.

$$ax^2 + bx + c$$

STEPS:

* If a is negative, factor out a -1.
1. SLIDE: multiply $a \cdot c$, then factor.
2. DIVIDE: by a, then reduce fractions
3. BOTTOMS UP: move the denominator to the coeff.
4. Check ✓ by FOILing

Example: **Factor** $7x^2 + 29x + 4$

SLIDE
$x^2 + 29x + 28$
$(x + \frac{28}{7})(x + \frac{1}{7})$

DIVIDE
$(x + 4)(x + \frac{1}{7})$

BOTTOMS UP
$(x + 4)(7x + 1)$

$7x^2 + x + 28x + 4$
$7x^2 + 29x + 4$ ✓

1. $5x^2 + 54x + 81$

$x^2 + 54x + 405$

$(x + \frac{45}{5})(x + \frac{9}{5})$

$(x + \frac{9}{1})(x + \frac{9}{5})$

$\boxed{(x+9)(5x+9)}$

$5x^2 + 9x + 45x + 81$

$5x^2 + 54x + 81$ ✓

2. $2x^2 + x - 36$

$x^2 + 1x - 72$

$(x - \frac{8}{2})(x + \frac{9}{2})$

$(x - \frac{4}{1})(x + \frac{9}{2})$

$\boxed{(x-4)(2x+9)}$

$2x^2 + 9x - 8x - 36$

$2x^2 + x - 36$ ✓

3. $9x^2 - 42x + 40$

$x^2 - 42x + 360$

$(x - \frac{30}{9})(x - \frac{12}{9})$

$(x - \frac{10}{3})(x - \frac{4}{3})$

$\boxed{(3x-10)(3x-4)}$

$9x^2 - 12x - 30x + 40$

$9x^2 - 42x + 40$ ✓

4. $10x^2 - 17x - 6$