# 1.4 Solve $ax^2+bx+c=0$ by Factoring

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## Factor $ax^2+bx+c$ using AC Method

| Step 1: | Multiple A x C | $3x^2+20x-7$ | -21 |
|---|---|---|---|
| Step 2: | Use the product to find the middle two terms | $(3x^2+21x)(-1x-7)$ | *must always factor out the negative for lead term in 2nd set parentheses |
| Step 3: | GCF each separately | $3x(x+7)-1(x+7)$ | *Must be the same |
| Step 4: | GCF entire expression | $(x+7)(3x-1)$ | |

## Factor with Special Patterns

| **Difference of Two Squares** | $9x^2-64$ |
|---|---|
| | $(3x+8)(3x-8)$ |
| **Perfect Square Trinomial** | $4x^2+20x+25$ |
| | 2x5=10 |
| | 10x2=20 |
| | $(2x+5)(2x+5)$ |
| | $(2x+5)^2$ |

## Factor out GCF first

| Example 1: | $5x^2-45$ | Example 2: | $6x^2-14x+8$ | |
|---|---|---|---|---|
| | $5(x^2-9)$ | | $2(3x^2-7x+4)$ | +12 |
| | $5(x+3)(x-3)$ | | $(3x^2-4x)(-3x+4)$ | |
| | | | $x(3x-4)-1(3x-4)$ | |
| | | | $2(3x-4)(x-1)$ | |

# Solve Quadratic Equations

| Example 1: | $3x^2+10x=8$ | Set equal to 0 |
|---|---|---|
| | $3x^2+10x-8=0$ | -24  A x C |
| | $(3x^2+12x)(-2x-8)=0$ | GCF each |
| | $3x(x+4)-2(x+4)=0$ | GCF entire |
| | $(x+4)(3x-2)=0$ | Set each factor equal to 0 |
| | $x+4=0$   $3x-2=0$ | Solve |
| | $x=-4$      $x=2/3$ | |