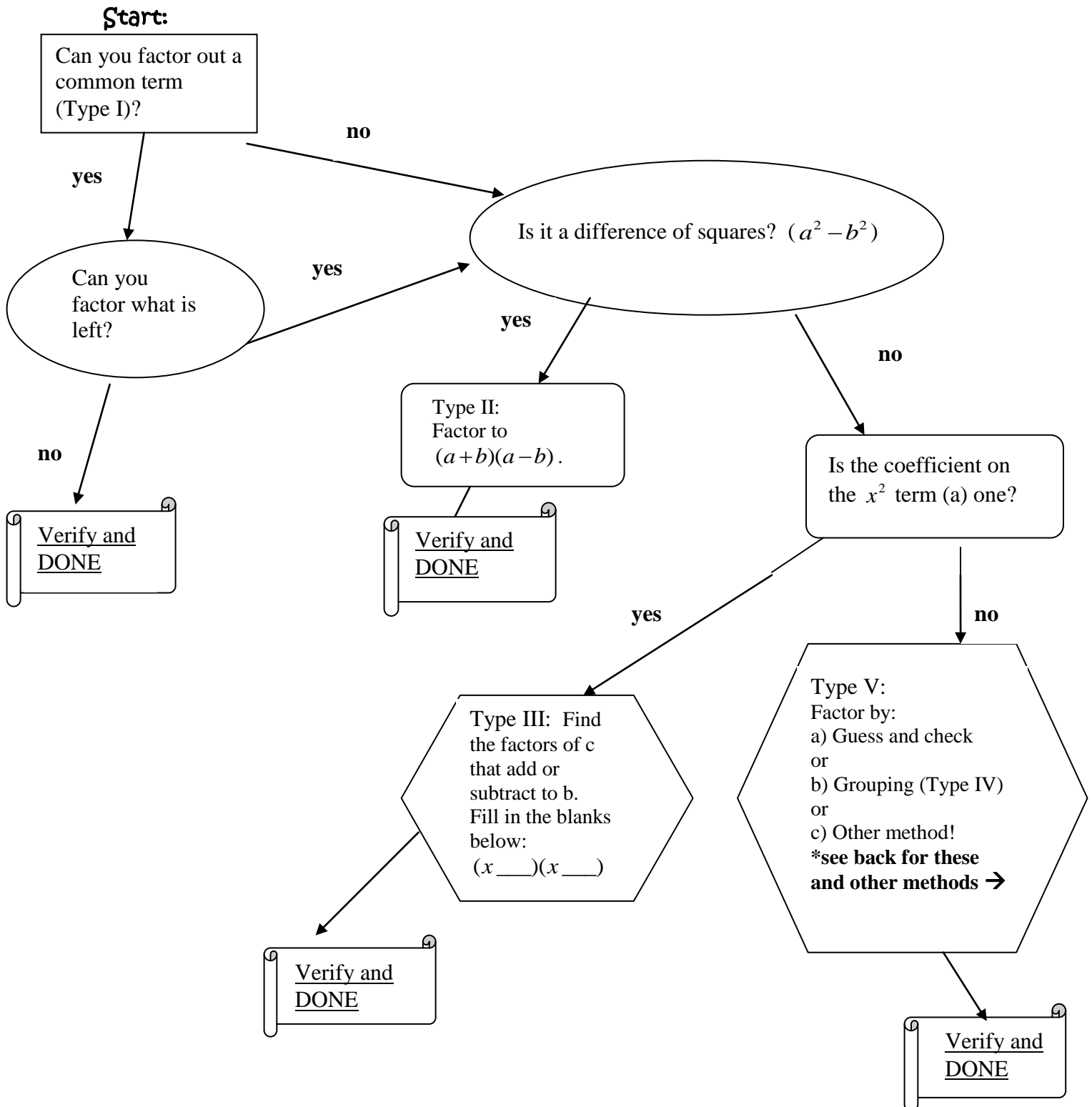


# Factoring Flow Chart

Quadratics:  $ax^2 + bx + c$



When you get to “DONE” double check to make sure you can’t factor out anything **AND** verify by multiplying!!

# Factoring Methods for $ax^2 + bx + c$

**ANY METHOD: Before factoring, factor out the GCF**

**ANY METHOD: After factoring, check by multiplying to verify original polynomial**

## Guess and Check

1. Factor out GCF.
2. Draw parentheses.
3. Find factors of a; find factors of c.
4. Try different pairings of factors until a pair works.

**Factor  $10x^2 + 21x + 8$**

Factors of 10: 1·10 and 2·5; Factors of 8: 1·8, 2·4

(1x + 1)(10x + 8) No

(1x + 8)(10x + 1) No

(1x + 2)(10x + 4) No

(1x + 4)(10x + 2) No

**(5x + 8)(2x + 1) Yes**

## Grouping

1. Factor out GCF.
2. Multiply ac.
3. Find two factors of ac that add or subtract to b.
4. Split bx term into sum of those two numbers.
5. Group first two terms and last two terms (reverse distribute).
6. Factor the common polynomial.

**Factor  $10x^2 + 21x + 8$**

10·8 = 80. Factors of 80 that add to 21: 16 and 5

$10x^2 + 16x + 5x + 8$

$2x(5x + 8) + (5x + 8)$

$(5x + 8)(2x + 1)$

## Box Method

1. Factor out GCF.
2. Draw a 2x2 box.
3. Put first term ( $ax^2$ ) in top left, last term (c) in bottom right
4. Multiply ac; find factors of ac that add to middle term b. Put these terms in top right and bottom left boxes.
5. Factor the GCF from each row and column.
6. These values make up the factors!

**Factor  $10x^2 + 21x + 8$**

10·8 = 80. Factors of 80 that add to 21: 16 & 5

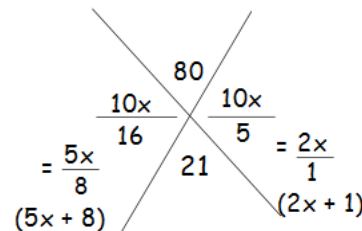
	5x	8
2x	10x <sup>2</sup>	16x
1	5x	8

Factors:  $(5x + 8)(2x + 1)$

## Diamond Method

1. Factor out GCF.
2. Draw a big X. Multiply ac and put in top of x; put b in bottom of x.
3. Find two factors of ac that add to b.
4. Put those factors on the left and right of the "X," but make as denominators of fractions.
5. Make leading coefficient multiplied by variable as the numerator of the fraction.
6. Reduce fractions if possible. These are your factors!

**Factor  $10x^2 + 21x + 8$**



## Slide and Divide

1. Factor out GCF.
2. Multiply ac and rewrite the trinomial with a leading coefficient of 1 and the third term as the product of ac ("slide").
3. Factor using strategies when leading coefficient is 1 (type III factoring).
4. Divide each numerical term by the original leading coefficient, and reduce to simplest form ("divide").
5. Multiply the terms in each set of parentheses by the LCD of the two terms.

**Factor  $10x^2 + 21x + 8$**

ac = 80; rewrite:  $x^2 + 21x + 80$

Factor:  $(x + 16)(x + 5)$

Divide by 10:  $(x + \frac{16}{10})(x + \frac{5}{10})$

Reduce:  $(x + \frac{8}{5})(x + \frac{1}{2})$

Multiply by LCD:  $(5x + 8)(2x + 1)$