

## Case I ( $ax^2 + bx + c$ ) $\rightarrow a = 1$

Factor each quadratic.

Examples:

$$x^2 - 10x + 24$$

Factors of 24, sum=10

$$(x - 6)(x - 4)$$

$$x^2 + x - 12$$

Factors of 12, sum = -1

$$(x + 4)(x - 3)$$

1)  $x^2 + 11x + 24$

2)  $x^2 - 4x - 12$

3)  $x^2 - 22x + 72$

4)  $x^2 - 19x - 20$

5)  $x^2 - 18x + 32$

6)  $x^2 - x - 42$

7)  $x^2 + 27x + 72$

8)  $x^2 + 4x - 96$

## Difference of Two Squares (DOTS):

A special type of quadratic:

- 1) Binomial (2 terms, not 3)
- 2) Must be a difference  $\rightarrow$  subtraction
- 3) Middle term or "x term" missing
- 4) Both terms are perfect squares

Looking at the "check" on these DOTS problems is helpful in understanding why we factor DOTS problems in this way.

(D.O.T.S)	Check:	(D.O.T.S)	Check:
$x^2 - 49$	$(x + 7)(x - 7)$	$4x^2 - 121$	$(2x + 11)(2x - 11)$
Diff of Two Sq.	$x(x - 7) + 7(x - 7)$	Diff of Two Sq	$2x(2x - 11) + 11(2x - 11)$
	$x^2 - 7x + 7x - 49$		$4x^2 - 22x + 22x - 121$
$(x + 7)(x - 7)$	$x^2 - 49 \checkmark$	$(2x + 11)(2x - 11)$	$4x^2 - 121 \checkmark$

9)  $x^2 - 144$

10)  $9x^2 - 1$

11)  $x^2 - 196$

12)  $16x^2 - 25$

13)  $x^2 - 36$

14)  $49x^2 - 4$

15)  $x^2 - 400$

16)  $169x^2 - 121$

## ***2Step Factoring:***

**Factor using the GCF and then try to factor what's left.**

Example:  $6x^2 - 18x + 12$

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

$$6(x - 2)(x - 1)$$

$$20x^2 - 125$$

$$5(4x^2 - 25)$$

$$5(2x + 5)(2x - 5)$$

***17)  $5x^2 - 5x - 100$***

***18)  $7x^2 - 252$***

***19)  $6x^5 + 72x^4 + 210x^3$***

***20)  $75x^9 - 108x^7$***

***21)  $12x^{10} + 12x^9 - 360x^8$***

***22)  $1,331x^2 - 275$***

## Grouping (or Case II):

### $a \neq 1$

#### Examples:

$6x^2 - 5x - 4$  (mult. 1<sup>st</sup> by last)  $F = -24$ ,  $S = -5$

$6x^2 - 8x + 3x - 4$  Split the middle term

$2x(3x - 4) + 1(3x - 4)$  Split and get GCF out of each side

$(3x - 4)(2x + 1)$  Take out the common binomial  $(3x - 4)$   
as a GCF, that leaves  $2x - 1$  as your 2<sup>nd</sup>  
binomial factor.

23)  $8x^2 - 5x - 3$

24)  $6x^2 + 37x + 6$

25)  $12x^2 + x - 6$

26)  $12x^2 - 17x + 6$

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27)  $10x^2 - 7x - 3$

28)  $18x^2 + 33x + 5$

29)  $16x^2 - 35x + 6$

30)  $7x^2 + x - 8$