

STEPS

FACTORING

- 1ST RULE IN EVERY SITUATION, TRY TO REMOVE A COMMON FACTOR
- LOOK AT THE NUMBER OF TERMS:

2 TERMS
↓

DIFFERENCE OF SQUARES

think $x^2 - 9 = (?)(?)$

rule $(x)^2 - (3)^2 = (x-3)(x+3)$

rule $(a)^2 - (b)^2 = (a-b)(a+b)$

SUM OF SQUARES

$x^2 + 16 =$ Does not factor

DIFFERENCE OF CUBES

$x^3 - 8 =$

think $(x)^3 - (2)^3 = (x-2)(x^2+2x+4)$

rule $(a)^3 - (b)^3 = (a-b)(a^2+ab+b^2)$

SUM OF CUBES

$8x^3 + 27 =$

think $(2x)^3 + (3)^3 = (2x+3)(4x^2-6x+9)$

rule $(a)^3 + (b)^3 = (a+b)(a^2-ab+b^2)$

6.2

3 TERMS: $ax^2 + bx + c$

6.3

EASIER WHEN $a=1$

$x^2 - 7x - 8$

USE "TRIAL & ERROR" METHOD

$(\quad)(\quad)$

$(x)(x)$

$(x)(x)$ then signs

$(x+1)(x-8)$ check

$x^2 - 9x + 8$

$(x-8)(x-1)$ check

$(x-8)(x-1)$ check

WHEN $a \neq 1$ & WHEN TRIAL & ERROR METHOD FAILS, USE THE GROUPING METHOD:

$3x^2 - 10x - 8$

$3x^2 + 2x - 12x - 8$

$x(3x+2) - 4(3x+2)$

$(x-4)(3x+2)$

Try:

$15x^2 + 4x - 3$

PROCESS:

1. REMOVE COMMON FACTOR? (NONE)

2. MULTIPLY FIRST-LAST = -24 "magic #"

3. LIST FACTORS
1. 24
2. 12
3. 8
4. 6

4. CHOOSE FACTORS THAT: "ADD" $\rightarrow$ middle term
"MULTIPLY" $\rightarrow$ magic #

5. REWRITE MIDDLE TERM AS THESE FACTORS

6. FACTOR BY GROUPING METHOD (SEE 4 TERM METHOD)

4 TERMS

6.1

FACTOR BY GROUPING

$x^3 + 8x^2 - 3x - 24$

$x^2(x+8) - 3(x+8)$
common factor
 $(x^2-3)(x+8)$

$x^2 + 5x - 2xy - 10$

$y^3 - y^2 - 5y +$

$bd + bc + d +$