

Factor by Grouping

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Ex. 1

$$\begin{aligned} & \frac{(x^2 + 2x)(-6x - 12)}{x \quad x \quad -6 \quad -6} \\ & x(x+2) - 6(x+2) \\ & (x+2)(x-6) \end{aligned}$$

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Ex. 2

$$\begin{aligned} & \frac{(6x^2 - 15x)(2x - 5)}{3x \quad 3x \quad 1 \quad 1} \\ & 3x(2x-5) + 1(2x-5) \\ & (2x-5)(3x+1) \end{aligned}$$

FACTOR the following polynomials.

1. $3x^2 + 7x + 4$ 2. $6a^2 + 17a + 12$

~~$\begin{matrix} a \cdot c & 12 \\ 3 & 4 \\ 7 & + \end{matrix}$~~

$\frac{(3x^2 + 3x)(4x + 4)}{3x \quad 3x \quad 4 \quad 4}$

$3x(x+1) + 4(x+1)$

$(x+1)(3x+4)$

~~$\begin{matrix} 72 & 8 \\ 9 & 17 \end{matrix}$~~

$\frac{(6a^2 + 9a)(3a + 4)}{3a \quad 3a \quad 4 \quad 4}$

$3a(2a+3) + 4(2a+3)$

$(2a+3)(3a+4)$

If $ax^2 + bx + c \dots$
 $2x^2 + 7x + 6$

Steps to follow

1. Multiply a and c
2. Find the factors of that product which add/subtract to get b
3. Rewrite ax^2 and c with two terms (spaces) between

Steps to follow

4. Write the factors in the two spaces between
5. Factor by grouping

FACTOR the following polynomials.

3. $20k^2 + 27k - 8$ 4. $9x^2 - 25xy - 6y^2$

~~$\begin{matrix} -160 & -5 \\ 32 & 27 \end{matrix}$~~

$\frac{(20k^2 + 32k)(-5k - 8)}{4k \quad 4k \quad -1 \quad -1}$

$4k(5k+8) - 1(5k+8)$

$(5k+8)(4k-1)$

~~$\begin{matrix} -54 & 2 \\ 9 & -25 \end{matrix}$~~

$\frac{(9x^2 - 27xy)(2xy - 6y^2)}{9x \quad 9x \quad 2y \quad 2y}$

$9x(x-3y) + 2y(x-3y)$

$(x-3y)(9x+2y)$