LESSON MAKER PRO

Factor Factory

Multiply linear factors to build polynomials.

HIGH SCHOOL · MT.PLUS.ALG.POLY.1

MT.PLUS.ALG.POLY.1 "Understand polynomials are created by multiplying linear factors."

NAME _____ DATE _____

FROM FACTORS TO POLYNOMIAL

Multiply each term in one linear factor by each term in the other, then combine like terms. If there are three factors, multiply two first, then multiply that result by the third.

WORKED EXAMPLE

Expand (x+8)(x-9).

1. Multiply by x: $x(x-9) = x^2-9x$.
2. Multiply by 8: $8(x-9) = 8x-72$.
3. Combine like terms: $x^2-9x+8x-72 = x^2-x-72$.

Answer: x^2-x-72

PRACTICE 6 problems

1 Expand (x+2)(x+5).

ANSWER _____

2 Expand (x-5)(x-11).

ANSWER _____

3 Expand (2x+3)(x-5).

ANSWER _____

4 Expand (x+3)(x-2)(x+5).

ANSWER _____

5 Expand (3x-2)(x+6).

ANSWER _____

6 Expand both (x+3)(x-5) and (x-3)(x+5). Which term changes?

ANSWER _____

APPLY IT Show your work

1 A school esports league has x+3 teams, with x+6 players on each team. Write and simplify an expression for the total number of players.

WORK SPACE

ANSWER _____

2 A student artist sells x+5 sticker packs for 2x-3 dollars per pack, where x is a whole number at least 2. Write and simplify an expression for the total revenue.

WORK SPACE

ANSWER _____

CHALLENGE One step up

The polynomial (x-2)(x+3)(x-k) has a constant term of 30, where k is a positive integer. Find k, then expand the polynomial.

WORK SPACE AND ANSWER

Factor Factory

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Expand (x+2)(x+5).	**$x^2+7x+10$**
2	Expand (x-5)(x-11).	**$x^2-16x+55$**
3	Expand (2x+3)(x-5).	**$2x^2-7x-15$**
4	Expand (x+3)(x-2)(x+5).	**x^3+6x^2-x-30**
5	Expand (3x-2)(x+6).	**$3x^2+16x-12$**
6	Expand both (x+3)(x-5) and (x-3)(x+5). Which term changes?	**(x+3)(x-5) = $x^2-2x-15$; (x-3)(x+5) = $x^2+2x-15$. Only the x-term changes.**

PART 2 · APPLY IT

1. **$x^2+9x+18$ players** Multiply the number of teams by the players per team: (x+3)(x+6) = $x^2+9x+18$.
2. **$2x^2+7x-15$ dollars** Multiply packs sold by the price per pack: (x+5)(2x-3) = $2x^2+7x-15$.

CHALLENGE

k = 5; $x^3-4x^2-11x+30$

Accept equivalent expanded forms with terms in a different order. In the challenge, the constant term is (-2)(3)(-k) = 6k, so k = 5.