LESSON MAKER PRO

Factor It Forward

Rewrite polynomial expressions as products over the real numbers.

HIGH SCHOOL · MA.912.AR.1.7

MA.912.AR.1.7 "Rewrite a polynomial expression as a product of polynomials over the real number system."

NAME _____ DATE _____

FACTOR COMPLETELY

First factor out a greatest common factor, if one exists. For $x^2 + bx + c$, find two numbers whose product is c and whose sum is b. Keep factoring until no factor can be rewritten as a product of real polynomial factors.

WORKED EXAMPLE

Factor $x^2 + 11x + 24$.

1. Find two numbers with product 24 and sum 11: 3 and 8.
2. Split the middle term: $x^2 + 3x + 8x + 24$.
3. Group: $x(x + 3) + 8(x + 3)$.
4. Factor the common binomial: $(x + 3)(x + 8)$.

Answer: $(x + 3)(x + 8)$

PRACTICE 6 problems

1 Factor completely: $5x^2 - 20x$

ANSWER _____

2 Factor completely: $x^2 - 25$

ANSWER _____

3 Factor completely: $x^2 + 17x + 60$

ANSWER _____

4 Factor completely: $4x^2 + 20x + 25$

ANSWER _____

5 Factor completely: $10x^2 - 31x - 14$

ANSWER _____

6 Factor completely: $4x^3 - 16x$

ANSWER _____

APPLY IT Show your work

1 The student media club is making a rectangular photo backdrop. Its area is $x^2 + 19x + 84$ square feet, where x is positive. Factor the expression to write possible dimensions of the backdrop.

WORK SPACE

ANSWER _____

2 A student designs a rectangular digital art display for a portfolio website. The display has an area of $x^2 + 22x + 117$ square units, where x is positive. Factor the expression to write possible dimensions of the display.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Factor completely: $4x^3 - 7x^2 - 64x + 112$

WORK SPACE AND ANSWER

ANSWER KEY # Factor It Forward

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Factor completely: $5x^2 - 20x$	**$5x(x - 4)$**
2	Factor completely: $x^2 - 25$	**$(x - 5)(x + 5)$**
3	Factor completely: $x^2 + 17x + 60$	**$(x + 5)(x + 12)$**
4	Factor completely: $4x^2 + 20x + 25$	**$(2x + 5)^2$**
5	Factor completely: $10x^2 - 31x - 14$	**$(5x + 2)(2x - 7)$**
6	Factor completely: $4x^3 - 16x$	**$4x(x - 2)(x + 2)$**

PART 2 · APPLY IT

1. **$(x + 7)(x + 12)$, so possible dimensions are $x + 7$ feet by $x + 12$ feet.** Find two numbers with product 84 and sum 19. They are 7 and 12.
2. **$(x + 9)(x + 13)$, so possible dimensions are $x + 9$ units by $x + 13$ units.** Find two numbers with product 117 and sum 22. They are 9 and 13.

CHALLENGE

$(4x - 7)(x - 4)(x + 4)$

Accept factors in any order. Accept equivalent repeated-factor notation, such as $(2x + 5)(2x + 5)$ for problem 4, and either order of the dimensions in the word problems.