LESSON MAKER PRO

Divide and Conquer

Simplify polynomial quotients one term at a time.

HIGH SCHOOL · MA.912.AR.1.4

MA.912.AR.1.4 "Divide a polynomial expression by a monomial expression with rational number coefficients."

NAME _____ DATE _____

DIVIDE EVERY TERM

Divide each term in the polynomial by the monomial. Divide the coefficients, then subtract the exponent of x in the divisor from each exponent of x in the dividend. When dividing by a fraction, multiply by its reciprocal.

WORKED EXAMPLE

$(34x^5 - 51x^4 + 68x^3) / (17x)$

1. $(34/17)x^{5-1} - (51/17)x^{4-1} + (68/17)x^{3-1}$
2. $= 2x^4 - 3x^3 + 4x^2$
3. Each term is divided by 17x.

Answer: $2x^4 - 3x^3 + 4x^2$

PRACTICE 6 problems

1 $(35x^4 - 49x^3) / (7x)$

ANSWER _____

2 $(-44x^5 + 22x^3) / (-11x)$

ANSWER _____

3 $((10/9)x^6 - (25/18)x^5) / ((5/18)x)$

ANSWER _____

4 $((-33/7)x^7 + (55/7)x^6) / ((11/14)x)$

ANSWER _____

5 $(63x^8 + 27x^7 - 45x^6) / (-9x^2)$

ANSWER _____

6 $((45/14)x^9 - (15/7)x^8) / (-(5/14)x^3)$

ANSWER _____

APPLY IT Show your work

1 An esports club models its total prize fund as $(21/4)x^3 + (7/2)x^2$ dollars. The club assigns $(7/4)x$ equal prize shares. Write a simplified expression for the dollars in each prize share.

WORK SPACE

ANSWER _____

2 A student film crew models its total editing time as $(15/11)x^4 - (10/11)x^3 + (25/11)x^2$ minutes. The work is split equally among $(5/11)x$ editing stations. Write a simplified expression for the minutes of work at each station.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Divide, then explain why the quotient has no x^5 term: $((7/9)x^8 - (14/27)x^6 + (35/18)x^5) / (-(7/18)x^2)$.

WORK SPACE AND ANSWER

ANSWER KEY

Divide and Conquer

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	$(35x^4 - 49x^3) / (7x)$	**$5x^3 - 7x^2$**
2	$(-44x^5 + 22x^3) / (-11x)$	**$4x^4 - 2x^2$**
3	$((10/9)x^6 - (25/18)x^5) / ((5/18)x)$	**$4x^5 - 5x^4$**
4	$((-33/7)x^7 + (55/7)x^6) / ((11/14)x)$	**$-6x^6 + 10x^5$**
5	$(63x^8 + 27x^7 - 45x^6) / (-9x^2)$	**$-7x^6 - 3x^5 + 5x^4$**
6	$((45/14)x^9 - (15/7)x^8) / (-(5/14)x^3)$	**$-9x^6 + 6x^5$**

PART 2 · APPLY IT

1. **$3x^2 + 2x$ dollars per prize share** Divide each term of the prize-fund expression by (7/4)x. The quotient is $3x^2 + 2x$.
2. **$3x^3 - 2x^2 + 5x$ minutes per editing station** Divide each term of the total-time expression by (5/11)x. The quotient is $3x^3 - 2x^2 + 5x$.

CHALLENGE

$-2x^6 + (4/3)x^4 - 5x^3$. The quotient has no x^5 term because the dividend has no x^7 term.

Accept equivalent simplified quotients with terms in any order. Require students to divide every term and reduce rational coefficients.