LESSON MAKER PRO

Divide and Conquer

Rewrite rational expressions with polynomial division.

HIGH SCHOOL · HSA-APR.D

CCSS.Math.Content.HSA-APR.D "Rewrite rational expressions"

NAME _____ DATE _____

QUOTIENT PLUS REMAINDER

When the numerator has degree at least as large as the denominator, divide the polynomials. Write the result as q(x) + r(x)/b(x), where the degree of r(x) is less than the degree of b(x).

WORKED EXAMPLE

Rewrite $(9x^2 + 28x + 15)/(x + 3)$.

1. Divide $9x^2$ by x to get 9x.
2. Multiply: $9x(x + 3) = 9x^2 + 27x$.
3. Subtract to get x + 15.
4. Divide x by x to get 1, then subtract x + 3 to get a remainder of 12.

Answer: 9x + 1 + 12/(x + 3)

PRACTICE 6 problems

1 Rewrite $(x^2 + 8x + 12)/(x + 2)$.

ANSWER _____

2 Rewrite $(2x^2 + 7x + 3)/(x + 3)$.

ANSWER _____

3 Rewrite $(3x^2 - x + 4)/(x - 1)$.

ANSWER _____

4 Rewrite $(x^3 - 2x^2 + 4x + 1)/(x - 2)$.

ANSWER _____

5 Rewrite $(2x^3 + x^2 - 5x + 7)/(x + 1)$.

ANSWER _____

6 Rewrite $(x^3 + 3x^2 + 5x + 8)/(x^2 + x + 1)$.

ANSWER _____

APPLY IT Show your work

1 A student media team uses $S(x) = x^2 + 4x + 9$ to model the total megabytes needed for a video project. Its planning spreadsheet divides this amount by $x + 1$ editing groups. Rewrite $S(x)/(x + 1)$ in quotient-plus-remainder form.

WORK SPACE

ANSWER _____

2 An esports club uses $C(x) = 2x^3 + 5x^2 - x + 9$ to model total practice credits at training level x. The club reports credits per $x + 2$ practice stations. Rewrite $C(x)/(x + 2)$ in quotient-plus-remainder form.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Rewrite $(2x^3 + 3x^2 - 5x + 4)/(2x^2 + x - 1)$ in the form $q(x) + r(x)/b(x)$.

WORK SPACE AND ANSWER

Divide and Conquer

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Rewrite $(x^2 + 8x + 12)/(x + 2)$.	**$x + 6$**
2	Rewrite $(2x^2 + 7x + 3)/(x + 3)$.	**$2x + 1$**
3	Rewrite $(3x^2 - x + 4)/(x - 1)$.	**$3x + 2 + 6/(x - 1)$**
4	Rewrite $(x^3 - 2x^2 + 4x + 1)/(x - 2)$.	**$x^2 + 4 + 9/(x - 2)$**
5	Rewrite $(2x^3 + x^2 - 5x + 7)/(x + 1)$.	**$2x^2 - x - 4 + 11/(x + 1)$**
6	Rewrite $(x^3 + 3x^2 + 5x + 8)/(x^2 + x + 1)$.	**$x + 2 + (2x + 6)/(x^2 + x + 1)$**

PART 2 · APPLY IT

1. **$x + 3 + 6/(x + 1)$** Divide $x^2 + 4x + 9$ by $x + 1$. The quotient is $x + 3$ and the remainder is 6.
2. **$2x^2 + x - 3 + 15/(x + 2)$** Divide $2x^3 + 5x^2 - x + 9$ by $x + 2$. The quotient is $2x^2 + x - 3$ and the remainder is 15.

CHALLENGE

$x + 1 + (-5x + 5)/(2x^2 + x - 1)$

Accept equivalent quotient-plus-remainder forms, including a negative remainder written with subtraction. Each rewritten expression is equivalent where its original denominator is not zero.