4.R.4 Exercises

Concept Check

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

1. When dividing polynomials, any remainder must be of smaller degree than the divisor.

2. The first step in the division algorithm is to align the polynomials in ascending order.

3. To aid in organization and clarity when dividing polynomials, it is best to fill in any missing powers with ones.

4. The process followed when dividing two polynomials is called the division algorithm with polynomials.

Practice

Express each quotient as a sum (or difference) of fractions and simplify, if possible.

5. $\dfrac{8y^3 - 16y^2 + 24y}{8y}$

6. $\dfrac{20y^5 - 14y^4 + 21y^3 + 42y^2}{4y^2}$

Divide by using the division algorithm. Write the answers in the form $Q + \frac{R}{D}$, where the degree of R < the degree of D.

7. $\dfrac{x^2 - 2x - 20}{x + 4}$

8. $\dfrac{21x^3 + 41x^2 + 13x + 5}{3x + 5}$

9. $\dfrac{x^4 - 3x^3 + 2x^2 - x + 2}{x - 3}$

10. $\dfrac{x^3 - 27}{x - 3}$

Applications

Solve.

11. ***Geometry:*** A moving company uses a box that has a volume of $x^3 - 2x^2 - 13x - 10$ cubic inches.

a. If the height of the box is $x + 2$, what is the area of the base of the box?

b. If the height of the box is $x + 1$, what is the area of the base of the box?

Writing & Thinking

12. Suppose that a polynomial is divided by $(3x-2)$ and the answer is given as $x^2+2x+4+\frac{20}{3x-2}$. What was the original polynomial? Explain how you arrived at this conclusion.