Name _____

4-3 Additional Practice

Multiplying and Dividing Rational Expressions

Write an equivalent expression. Specify the domain.

1. $\frac{4x + 6}{2x + 3}$

2. $\frac{3x^2 - 12}{x^2 - x - 6}$

3. $\frac{x^2 + 13x + 40}{x^2 - 2x - 35}$

What is the simplified form of each rational expression? Specify the domain.

4. $\frac{2x^2 + 11x + 5}{3x^2 + 17x + 10}$

5. $\frac{6x^2 + 5xy - 6y^2}{3x^2 - 5xy + 2y^2}$

6. $\frac{x^2 + 3x - 18}{x^2 - 36}$

Find the product and the domain.

7. $\frac{5a}{5a + 5} \cdot (10a + 10)$

8. $\frac{x^2 - 5x}{x^2 - 3x} \cdot \frac{x + 3}{x - 5}$

9. $\frac{5y - 20}{3y + 15} \cdot \frac{7y + 35}{10y + 40}$

Find the quotient and the domain.

10. $\frac{7x^4}{24y^5} \div \frac{21x}{12y^4}$

11. $\frac{y^2 - 49}{(y - 7)^2} \div \frac{5y + 35}{y^2 - 7y}$

12. $\frac{y^2 - 5y + 4}{y^2 - 1} \div \frac{y^2 - 9}{y^2 + 5y + 4}$

13. A farmer must decide whether to build a cylindrical grain silo with radius r, or a rectangular grain silo with width r and length $2r$. Both silos have the same height h. Which has the greater ratio of volume to surface area? Explain.

14. How do you know what values to exclude from the domain?

4-3 Additional Practice

Multiplying and Dividing Rational Expressions

Write an equivalent expression. Specify the domain.

1. $\frac{4x + 6}{2x + 3}$

   $2;\ x = -\frac{3}{2}$

2. $\frac{3x^2 - 12}{x^2 - x - 6}$

   $\frac{3x - 6}{x - 3};\ x \neq -2, 3$

3. $\frac{x^2 + 13x + 40}{x^2 - 2x - 35}$

   $\frac{x + 8}{x - 7};\ x \neq -5, 7$

What is the simplified form of each rational expression? Specify the domain.

4. $\frac{2x^2 + 11x + 5}{3x^2 + 17x + 10}$

   $\frac{2x + 1}{3x + 2};\ x \neq -5, -\frac{2}{3}$

5. $\frac{6x^2 + 5xy - 6y^2}{3x^2 - 5xy + 2y^2}$

   $\frac{2x + 3y}{x - y};\ x \neq -y, \frac{2}{3}y$

6. $\frac{x^2 + 3x - 18}{x^2 - 36}$

   $\frac{x - 3}{x - 6};\ x \neq \pm 6$

Find the product and the domain.

7. $\frac{5a}{5a + 5} \cdot (10a + 10)$

   $10a;\ a \neq -1, 0$

8. $\frac{x^2 - 5x}{x^2 - 3x} \cdot \frac{x + 3}{x - 5}$

   $1;\ x \neq 0, 3, 5$

9. $\frac{5y - 20}{3y + 15} \cdot \frac{7y + 35}{10y + 40}$

   $\frac{7(y - 4)}{6(y + 5)};\ x \neq -5, -4$

Find the quotient and the domain.

10. $\frac{7x^4}{24y^5} \div \frac{21x}{12y^4}$

    $\frac{x^3}{6y};\ x, y \neq 0$

11. $\frac{y^2 - 49}{(y - 7)^2} \div \frac{5y + 35}{y^2 - 7y}$

    $\frac{y}{5};\ y \neq 0, \pm 7$

12. $\frac{y^2 - 5y + 4}{y^2 - 1} \div \frac{y^2 - 9}{y^2 + 5y + 4}$

    $\frac{y^2 - 16}{y^2 - 9};\ y \neq \pm 1, \pm 3, -4$

13. A farmer must decide whether to build a cylindrical grain silo with radius r, or a rectangular grain silo with width r and length $2r$. Both silos have the same height h. Which has the greater ratio of volume to surface area? Explain.

    The cylinder, because the ratio for the cylinder is $\frac{rh}{2r + 2h}$, and the ratio for the rectangular prism is $\frac{rh}{2r + 3h}$.

14. How do you know what values to exclude from the domain?

    Answers may vary: Sample: Any value of the variable that makes the denominator equal to zero.