

12-2

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Multiplying Rational Expressions

(Pages 667–670)

To multiply rational expressions, you can divide by the common factors either *before* or *after* you multiply the expressions. From this point on, you may assume that no denominator has a value of 0.

EXAMPLE

Multiply $\frac{2x^2(3x-2)}{3x^2+x-2} \cdot \frac{1}{4x}$.

$$\frac{2x^2(3x-2)}{3x^2+x-2} \cdot \frac{1}{4x} = \frac{2x^2(3x-2)}{(3x-2)(x+1)} \cdot \frac{1}{4x} \quad \text{Factor the denominator.}$$

$$= \frac{\overset{1}{\cancel{2x^2}}(\overset{1}{\cancel{3x-2}})}{\underset{1}{\cancel{(3x-2)}}(x+1)} \cdot \frac{1}{\underset{2}{\cancel{4x}}} \quad \text{Divide by the GCF of } 2x(3x-2) \text{ before multiplying.}$$

$$= \frac{x}{2(x+1)} \text{ or } \frac{x}{2x+2} \quad \text{Multiply. Then, simplify the denominator.}$$

Try These Together

1. Multiply $\frac{ab^2}{12} \cdot \frac{6}{b}$.

HINT: Divide both numerator and denominator by the same quantity—their greatest common factor.

2. Multiply $(x-8) \cdot \frac{4}{x^2-64}$.

HINT: Write $x-8$ as $\frac{x-8}{1}$.

PRACTICE

Find each product. Assume that no denominator has a value of 0.

3. $\frac{15a}{b^3} \cdot \frac{2b^4}{3}$

4. $\frac{3x^4yz^2}{24y^2} \cdot \frac{4}{x}$

5. $16abc \cdot \frac{ab}{bc^2}$

6. $\frac{25mn^2}{4n} \cdot \frac{10n^3}{5m}$

7. $(2x+8) \cdot \frac{7}{x+4}$

8. $\frac{12(a-1)}{3a} \cdot \frac{a^2}{a-1}$

9. $\frac{x+2}{5} \cdot \frac{2}{x^2+2x}$

10. $\frac{x^2-9}{x-3} \cdot \frac{9x-6}{3}$

11. $\frac{2x-10}{3x} \cdot \frac{6x^2}{x^2-25}$

12. $\frac{x^2+16}{x} \cdot \frac{x}{x+4}$

13. $\frac{4x+2}{2x+6} \cdot \frac{6}{2x^2+7x+3}$

14. $\frac{x^2+2x-15}{x^2+4x} \cdot \frac{x^2}{x+5}$

15. $\frac{y^2-36}{y+3} \cdot \frac{y-4}{y^2+2y-24}$

16. $\frac{3x+12}{x^2-x-2} \cdot \frac{2x-2}{6x+24}$

17. $\frac{3x^2-6x-9}{x^2-x-2} \cdot \frac{x^2-4}{6x+12}$



18. **Standardized Test Practice** Multiply $\frac{x^2+14x+49}{x^2-49} \cdot \frac{x-7}{x+7}$.

A $x+7$

B $\frac{1}{x+7}$

C 1

D $x-2$

Answers: 1. $\frac{2b}{4}$	2. $\frac{x+8}{4}$	3. $10ab$	4. $\frac{x^2z^2}{2y}$	5. $\frac{16a^2b}{c}$	6. $\frac{25n^4}{2}$	7. 14	8. $4a$	9. $\frac{5x}{2}$	10. $3x^2+7x-6$	11. $\frac{x+5}{4x}$	12. $\frac{x+4}{x^2+16}$	13. $\frac{x^2+6x+9}{6}$	14. $\frac{x+4}{x^2-3x}$	15. $\frac{y+3}{y-6}$	16. $\frac{x^2-x-2}{x-1}$	17. $\frac{x-3}{x-2}$	18. C
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