Multiply and Divide Rational Expressions

How do you multiply rational expressions?

How do you divide rational expressions?

Example 1 How do you multiply rational expressions?

Multiply straight across the numerators and straight across the denominators.

A] $\dfrac{6x^3y}{xy^2}\cdot\dfrac{3x^2y}{8x^3}$

B] $\dfrac{(2xy)^4}{xy^2}\cdot\left(\dfrac{4x^2y}{x^3}\right)^{-1}$

C] $\dfrac{x^2+2x-15}{15-5x}\cdot\dfrac{10x}{x+5}$

D] $\left(\dfrac{x^2-4}{x^2-2x+4}\right)\left(\dfrac{x^3+8}{x^2+4x+4}\right)$

Example 2 How do you divide rational expressions?

Multiply the first fraction by the reciprocal of the second fraction.

A] $\dfrac{16x^2y}{81xy^2}\div\dfrac{24x^2y}{54x^3y^3}$

B] $\dfrac{4n}{n-6}\div\dfrac{4n}{8n-48}$

C] $\dfrac{2x^2+4x}{x^2-4}\div\dfrac{x^2-3x+2}{3x-6}$

Example 3 Application in Geometry

In the diagrams below, the length of the edge of the square is twice as long as the radius of the circle. Find the ratio of the area of the circle to the area of the square. Write your answer in simplified form.