

9-3: Multiplying & Dividing Rational Expressions.

Not only can we graph rational functions (look like a fraction), but we can also divide, multiply, & simplify them.

ex1) Simplify $\frac{2x(x+1)}{(x+1)(x^2-4)}$

$$\boxed{\frac{2x}{x^2-4}}$$

ex2) Simplify $\frac{3a^3 - a^4}{2a^3 - 6a^2} = \frac{-a^3(3+a)}{2a^2(a-3)}$

$$= \frac{-a^3(a+3)}{2a^2(a-3)}$$

$$= \frac{-a^{\cancel{3}}}{2\cancel{a^2}} = \frac{-a}{2}$$

ex.3) Simplify $\frac{2a^{\cancel{1}}}{5b^{\cancel{1}}} \cdot \frac{3\cancel{c}^{\cancel{1}}}{4\cancel{8}a^{\cancel{1}}}$

$$\boxed{= \frac{3c}{20ab}}$$

ex.4) $\frac{8x^2y}{15a^2b} \div \frac{2xy^2}{5ab^4}$ use reciprocal

$$\frac{\cancel{4}8\cancel{x}^{\cancel{1}}}{3\cancel{15}a^{\cancel{1}}b} \cdot \frac{\cancel{15}x^{\cancel{1}}b^{\cancel{3}}}{\cancel{1}2\cancel{y}^{\cancel{1}}} = \boxed{\frac{4b^3x}{3ay}}$$

ex.5) $\frac{x^2 + 2x - 8}{x^2 + 4x + 3} \div \frac{x - 2}{3x + 3}$

Factor trinomials

$$\frac{x^2 + 2x - 8}{x^2 + 4x + 3}$$

$$\frac{(x + 4)(\cancel{x - 2})}{(x + 3)(\cancel{x + 1})}$$

$$\cdot \frac{3x + 3}{x - 2}$$

Factor out 3

$$\cdot \frac{3(\cancel{x + 1})}{\cancel{x - 2}}$$

$$\frac{(x+4)^3}{x+3} = \frac{3x+12}{x+3}$$

ex 6) $\frac{5a^2 - 20}{2a + 2}$ } num Complex
 $\div \rightarrow \frac{10a - 20}{4a}$ } Den Fraction

$$\frac{5a - 20}{2a + 2} \div \frac{10a - 20}{4a}$$

$$\frac{5a^2 - 20}{2a + 2} \cdot \frac{4a}{10a - 20}$$

$$\frac{1 \cancel{8}(a^2 - 4)}{1 \cancel{2}(a + 1)} \cdot \frac{2 \cancel{4}a}{2 \cancel{10}(a - 2)}$$

$$\frac{2a(a^2 - 4)}{2(a + 1)(a - 2)} = \frac{2a(a + 2)(\cancel{a - 2})}{2(a + 1)(\cancel{a - 2})}$$

$$= \frac{\cancel{2}a(a + 2) \cancel{*}}{\cancel{2}(a + 1)} = \frac{a^2 + 2a}{a + 1}$$