

Multiplying + Dividing Algebraic Fractions

These examples are on worksheet #10 in yellow book:

e.g 1

$$\frac{8}{x^2-36} \cdot \frac{x+6}{4x+4}$$

$$\frac{8}{(x-6)(x+6)} \cdot \frac{(x+6)}{4(x+1)} = \frac{\cancel{2} \cancel{8} \cancel{(x+6)}}{\cancel{4} (x-6) \cancel{(x+6)} (x+1)}$$

$$= \frac{2}{(x-6)(x+1)}$$

* Factored all
tops + bottoms.

Then cancel top with any bottom.

Write what's LEFT!

e.g. 2

$$\frac{y^2 + 6y + 5}{\textcircled{1} 7y^2 - 63} \cdot \frac{7y + 21}{(5+y)^2} \cdot \frac{3-y}{1+y}$$

① $7y^2 - 63$
 $7(y^2 - 9)$
 $7(y-3)(y+3)$

$$\frac{\cancel{1}(y+5)\cancel{(y+1)}}{\cancel{7}(y-3)\cancel{(y+3)}} \cdot \frac{\cancel{7}(y+3)}{\cancel{(5+y)}(5+y)} \cdot \frac{\cancel{1}(3-y)}{\cancel{(1+y)}}$$

$-1 \cdot \boxed{(-3+y)}$

$$= \frac{-1}{5+y}$$

e.g 3

$$\frac{2x+y}{y^2} \cdot \frac{3y^2-3xy}{xy+2x^2} \cdot \frac{5xy-10x^2}{y^2-3xy+2x^2}$$

$$\frac{\cancel{(2x+y)}}{y\cancel{y}} \cdot \frac{\cancel{3}y\cancel{(y-x)}}{x(\cancel{y+2x})} \cdot \frac{5x\cancel{(y-2x)}}{(\cancel{y-x})(\cancel{y-2x})}$$

$$= \frac{15}{y}$$

e.g 4

$$\frac{-x-y}{4x} \cdot \frac{\overset{y^2-x^2}{-x^2+y^2}}{-a} \cdot \frac{-2xa}{(x+y)^2}$$

$$\frac{-1(\cancel{x+y})}{4\cancel{x}} \cdot \frac{(y-x)(\cancel{y+x})}{-1\cancel{a}} \cdot \frac{-2\cancel{xa}}{(\cancel{x+y})(\cancel{y+x})}$$

$$\frac{2(y-x)}{-4} = \frac{1(y-x)}{-2}$$

$$\text{OR } \frac{-1(y-x)}{2}$$

$$\text{OR } \frac{-y+x}{2}$$

$$\text{OR } \frac{x-y}{2}$$

e.g. 5

$$\frac{2}{3} \div \frac{5}{6}$$

$$\frac{2}{3} \cdot \frac{6}{5} = \frac{12}{15} \begin{array}{l} \div 3 \\ \div 3 \end{array} = \frac{4}{5}$$

e.g. 4

$$\frac{5a^2}{b^2-36} \div \frac{2Sab-2Sa}{b^2-7b+6}$$

$$\frac{5a^2}{b^2-36} \cdot \frac{b^2-7b+6}{2Sab-2Sa}$$

$$\frac{\cancel{1}5a^2}{(\cancel{b-6})(b+6)} \cdot \frac{(\cancel{b-6})(\cancel{b-1})}{\cancel{5}2\cancel{S}(\cancel{b-1})}$$

$$\boxed{\frac{a}{S(b+6)}}$$

e.g 7

$$\frac{2-x}{b} \div \frac{x^2+2x}{4a^2-a^2x^2}$$

$$\frac{2-x}{b} \cdot \frac{4a^2-a^2x^2}{x^2+2x}$$

$$\frac{(2-x)}{b} \cdot \frac{a^2(2-x)(\cancel{2+x})}{x(\cancel{x+2})}$$

$$\frac{a^2(2-x)^2}{bx}$$

$$\begin{array}{l} 4a^2 - a^2x^2 \\ a^2(4-x^2) \\ \swarrow \searrow \\ a^2(2-x)(2+x) \end{array}$$

e.g. 8

$$\frac{x^2 - 8x - 9}{x^2 - 17x + 72} \cdot \frac{x^2 - 25}{x^2 - 1} \div \frac{x^2 + 4x - 5}{x^2 - 9x + 8}$$

$$\frac{x^2 - 8x - 9}{x^2 - 17x + 72} \cdot \frac{x^2 - 25}{x^2 - 1} \cdot \frac{x^2 - 9x + 8}{x^2 + 4x - 5}$$

$$\frac{\cancel{(x-9)} \cancel{(x+1)}}{\cancel{(x-8)} \cancel{(x-9)}} \cdot \frac{\cancel{(x-5)} \cancel{(x+5)}}{(x-1) \cancel{(x+1)}} \cdot \frac{\cancel{(x-8)} \cancel{(x-1)}}{\cancel{(x+5)} \cancel{(x-1)}}$$

$$= \frac{x-5}{x-1}$$

Do Worksheet #10 and quiz #8