

Unit 1: Simplifying Algebraic Fractions

ex. $\frac{4x}{8x^2} = \frac{1}{2x}$

$$\frac{\cancel{4}x}{4 \cdot \cancel{2}x \cdot x} = \frac{1}{2x}$$

ex. $\frac{2m+8}{m^2+6m+8}$

$$\frac{2(\cancel{m+4})}{(m+2)(\cancel{m+4})}$$

$$\frac{2}{(m+2)}$$

Fractions

Steps

① FACTOR the numerator and denominator individually

(why? to obtain one term in the top, one term in the bottom)

Step ②: Cancel

out identical factors that are dividing each other

Simplify:

$$\frac{42abc^3}{3ab}$$

$$3ab$$

$$\frac{14bc^3}{9}$$

9

$$\frac{(x+1)}{(x+1)+1}$$

$$(x+1)+1$$

$$\frac{(x+1)}{x+1+1}$$

$$x+1+1$$

$$\frac{x+1}{x+2}$$

$$x+2$$

$$\frac{p^2 - 4}{2p^2 + 7p + 6}$$

$$\textcircled{2} 2p^2 + 7p + 6$$

$$\textcircled{2} 2p^2 + 7p + 6$$

$$\underbrace{2 \times 6 = 12}_{\textcircled{1}}$$

$$\frac{2p^2 + 4p + 3p + 6}{2p \quad 2p \quad 3 \quad 3}$$

$$\frac{2p(p+2) + 3(p+2)}{(p+2)(p+2)}$$

$$\dots (p+2)(2p+3)$$

$$\frac{(p-2)(p+2)}{(p+2)(2p+3)}$$

$$\frac{(p-2)}{(2p+3)}$$

$$\frac{(p-2)}{(2p+3)}$$

Unit 2: Product and Quotient of Algebraic Fractions

ex ① $\frac{5a^2}{b^2-36}$ ② $\frac{25ab-25a}{b^2-7b+6}$

$$\frac{5a^2}{(b+6)(b-6)} \div \frac{25a(b-1)}{(b-6)(b-1)}$$

$$\frac{5a^2}{(b+6)(b-6)} \div \frac{25a}{(b-6)}$$

$$\frac{5a^2}{(b+6)(b-6)} \times \frac{(b-6)}{25a}$$

$$\frac{\cancel{5a^2}(b-6)}{(b+6)(b-6)\cancel{25a}}$$

$$\frac{a}{5(b+6)}$$

① FACTOR

② Simplify

③ Perform Operation
for dividing i. change sign
to 'x'; flip
2nd fraction

ii. Over one
fraction, "multiply"
the tops (push them
together). Do the same
to the bottom.

④ FACTOR (if necessary
or possible)

⑤ Simplify (if possible)

$$\frac{5}{25} = \frac{\cancel{5}}{\cancel{5} \cdot 5} = \frac{1}{5}$$

Evaluate

$$\textcircled{1} \frac{y^2 + 6y + 5}{7y^2 - 63} \times \textcircled{2} \frac{7y + 21}{(5+y)^2} \div \textcircled{3} \frac{(1+y)}{\textcircled{4} 3-y}$$

$$\frac{(y+5)(y+1)}{7(y-3)(y+3)} \times \frac{7(y+3)}{(5+y)(5+y)} \div \frac{1+y}{3-y}$$

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

$$\frac{(y+1)}{(y-3)(5+y)} \div \frac{1+y}{3-y}$$

$$\frac{(y+1)}{(y-3)(5+y)} \times \frac{3-y}{1+y}$$

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

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

① FACTOR

② Simplify (each fraction individually)

③ Perform operation

BEDMAS tells you what operation to do first. multiplying and dividing are on the same level: Go left to right.

for multiplying i. over one divide sign, push tops / push bottom together

④ FACTOR

⑤ Simplify

Now do ③ ④ ⑤ for 2nd operation

factor out a negative -1
O.C.F. -1
B
D

$$\frac{9a^2 - 6a + 1}{a-5} \div \frac{a^2 - 4a + 4}{5(a-2) - a(a-2)} \div (3a-1)$$

$(a-2)(a-2)$

① $\frac{5(a-2) - a(a-2)}{(a-5)}$ $\frac{gcf(a-2)}{9}$ $\frac{9}{9}$

② $9a^2 - 6a + 1$
 $\frac{9a^2 - 3a - 3a + 1}{3a(3a-1) - 1(3a-1)}$
 $\frac{(3a-1)(3a-1)}{(3a-1)(3a-1)}$

$$\frac{(3a-1)(3a-1)}{(a-5)} \div \frac{(a-2)(a-2)}{(a-2)(5-a)} \div (3a-1)$$

$$\frac{(3a-1)(3a-1)}{(a-5)} \div \frac{(a-2)}{(5-a)} \div (3a-1)$$

$$\frac{(3a-1)(3a-1)}{(a-5)} \times \frac{(5-a)}{(a-2)} \div (3a-1)$$

$$\frac{(3a-1)(3a-1)(-5+a)}{(a-5)(a-2)} \div (3a-1)$$

$$\frac{-1(3a-1)(3a-1)}{(a-2)} \div \frac{(3a-1)}{1}$$

$$\frac{-1(3a-1)(3a-1)}{(a-2)} \times \frac{1}{(3a-1)}$$

$$\frac{-1(3a-1)(3a-1)}{(a-2)(3a-1)} = \frac{-1(3a-1)}{(a-2)}$$

$$1) \frac{b^2 - b - 20}{b^2 - 25} \div \frac{b^2 + 2b - 8}{b^2 - b - 2} \div \frac{b + 1}{b^2 + 5b}$$

~~YOU CAN'T CROSS OUT IF Y'A MORE THAN 1 TERM!~~

$$2) \frac{x^2 - 3x + 2}{1 - x^2} \times \frac{x^2 + 4x + 3}{x^2 + x - 6} \div \frac{x^3 - 25x}{x^2 + 5x}$$