

Simplifying with Opposite Factors

In general, for all real numbers a and b , $a \neq b$,

$$(a-b) = -1(b-a) \quad \text{and} \quad \frac{a-b}{b-a} = \frac{-1(b-a)}{b-a} = -1$$

$$\text{Ex: } (5-b) = -1(b-5) \quad \frac{5-b}{b-5} = \frac{-1(b-5)}{(b-5)} = -1$$

$$\text{TRY: } \frac{5b-10a}{2a-b}$$

Sometimes many steps are involved:

$$\frac{3m^2 - 3m + m - 1}{3 - 3m}$$

$$\frac{3m(m-1) + 1(m-1)}{3(1-m)}$$

factor the numerator by grouping and factor out the GCF in the denominator

$$\frac{(m-1)(3m+1)}{3(1-m)}$$

finish factoring the numerator

$$\frac{(m-1)(3m+1)}{-3(m-1)}$$

change $3(1-m)$ to $-3(m-1)$ by factoring out a -1

$$\frac{(3m+1)}{-3}$$

reduce by $(m-1)$

$$-\frac{3m+1}{3}$$

write the negative sign out in front of the expression