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*I can **factor expressions** to solve problems.* nonlinear expressions.

Although it may appear that some expressions cannot be factored, you can sometimes factor the

coefficient of the variable.

Factoring Out the Coefficient of the Variable (Fractions)

1.) $\frac{1}{2}c-\frac{3}{2}$ $-\frac{3}{2}\cdot\frac{2}{1}=\frac{-6}{2}=-3$

$\frac{1}{2}(c-3)$

1.) $\frac{2}{3}j+\frac{2}{9}$ $\frac{2}{9}\cdot\frac{3}{2}=\frac{6}{18}=\frac{1}{3}$

$\frac{2}{3}(j+\frac{1}{3})$

2.) $\frac{1}{2}+\frac{3}{2}m$ $\frac{1}{2}\cdot\frac{2}{3}=\frac{2}{6}=\frac{1}{3}$

$\frac{3}{2}(\frac{1}{3}+m)$

2.) $\frac{3}{5}-\frac{3}{10}a$ $\frac{3}{5}\cdot\frac{-10}{3}=\frac{-30}{15}=-2$

$-\frac{3}{10}(-2+a)$ or opposite

3.) $-\frac{1}{3}x-12$ $\frac{-12}{1}\cdot\frac{-3}{1}=36$

$-\frac{1}{3}(x+36)$ or opposite

3.) $-\frac{1}{3}+\frac{5}{6}y$ $-\frac{1}{3}\cdot\frac{6}{5}=\frac{-6}{15}=-\frac{2}{5}$

$\frac{5}{6}(-\frac{2}{5}+y)$

Factoring Out the Coefficient of the Variable (Decimals)

1.) 2.8a – 16.8

$2.8(a-6)$

1.) -1.2k + 2.4

$-1.2(k-2)$ or opposite

2.) 1.5b – 4.5

$1.5(b-3)$

2.) 1.1k + 10.78

$1.1(k+9.8)$

Sometimes you're told what to factor out...

1. Factor $-\frac{1}{2}$ out of $-\frac{1}{2}x + 6$.

$\frac{6}{1} \cdot \frac{-2}{1} = \frac{-12}{1}$

$-\frac{1}{2}(x-12)$

2. Factor $-\frac{1}{4}$ out of $-\frac{1}{2}x - \frac{5}{4}y$.

$-\frac{1}{2} \cdot \frac{-4}{1} = \frac{4}{2} = 2$ $\quad -\frac{5}{4} \cdot \frac{-4}{1} = \frac{20}{4} = 5$

$-\frac{1}{4}(2x+5)$

3. Factor $\frac{1}{4}$ out of $\frac{1}{8}k - \frac{3}{4}$.

$\frac{1}{8} \cdot \frac{4}{1} = \frac{4}{8} = \frac{1}{2}$ $\quad -\frac{3}{4} \cdot \frac{4}{1} = \frac{-12}{4} = -3$

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

4. Factor $-\frac{1}{2}$ out of $\frac{2}{5}a - \frac{3}{4}b + \frac{7}{8}$.

$\frac{2}{5} \cdot \frac{-2}{1} = \frac{-4}{5}$ $\quad -\frac{3}{4} \cdot \frac{-2}{1} = \frac{6}{4} = 1\frac{1}{2}$ $\quad \frac{7}{8} \cdot \frac{-2}{1} = \frac{-14}{8}$

$-\frac{1}{2}(-\frac{4}{5}a + 1\frac{1}{2}b - 1\frac{3}{4})$

Factoring with Exponents

Factor out the GCF, which for variables means the highest exponent they have in common.

*Remember: when dividing variables with exponents, you subtract

1) $6n^7 - 15n^8$

$3n^7(2-5n)$

2) $2m^5 + 4m$

$2m(m^4+2)$

3) $-2r^3 - 2r^2$

$-2r^2(r+1)$

4) $-3n - 9n^3$

$-3n(1+3n^2)$