

**Aim: How do we perform partial fraction decomposition?****I. Do Now:**

1. Solve the system of equations for  $x$  and  $y$ .
- $$\begin{cases} 2x + 3y = 7 \\ 3x + 2y = 3 \end{cases}$$

2. Combine (express as a single fraction):

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

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

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**II. Decomposition of Fractions:** A way to “break down” fractions into the sum (or difference) of “simpler” fractions.

Technique:

- (1) If the fraction is improper (degree of num.  $\geq$  degree of denom.), do long division and then decompose the resultant fraction, if possible.
- (2) Factor the denominator of the fraction into irreducible quadratic or linear factors.
- (3) *Linear* factors in the denominator have *constant* numerators.
- (4) *Quadratic* factors in the denominator have *linear* numerators.
- (5) *Repeated* quadratic or linear factors will be addressed in another lesson.

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**III. Examples:** Find each partial fraction decomposition.

3.  $\frac{6x-8}{x^2-x-6}$

4.  $\frac{x^2-3x-44}{x^2-16}$