

EQ:

RECALL: How do you add rational functions?

Rational Expression ---- _____ of _____
 where _____ \neq _____

Ex. 1 $\frac{3}{x+4} + \frac{2}{x-3}$

❖ New Topic:

How do you go from $\frac{5x-1}{x^2+x-12}$ back to $\frac{3}{x+4} + \frac{2}{x-3}$?

- We assume _____ and _____ have no _____ factors.
- _____ is _____ if _____ $<$ _____
 _____ reduced by _____
- _____ is _____ if _____ $>$ _____
 _____ reduced by _____

There are _____ for Decomposition. We will only discuss **CASE 1**. It is the only case you will use in **AP Calculus**. The Remaining Cases (II - IV) are covered in later calculus courses.

❖ **CASE 1:** Q has only _____ factors

$$\frac{P(x)}{Q(x)} = \frac{A_1}{x - a_1} + \frac{A_2}{x - a_2} + \dots + \frac{A_n}{x - a_n}$$

Ex 2. $\frac{3x+2}{x^2+x}$ STEP 1: Factor Q _____ = _____

Then we can conclude: _____ = _____ + _____

Clear Fractions:

Now we have: _____ = _____

Therefore: _____ = _____

_____ = _____

STEP 3: Set up a system. _____ = _____

_____ = _____

Then Solve: A = _____ , B = _____

STEP 4: Write Partial Fraction Decomposition:

Ex 3. Write the partial decomposition of $\frac{x}{x^2 - 5x + 6}$.

STEP 1: Factor Q _____ = _____

Then we can conclude: _____ = _____ + _____

STEP 2: Clear Fractions _____ = _____ + _____

$$x = \underline{\hspace{2cm}}$$

$$x = \underline{\hspace{2cm}}$$

$$x = \underline{\hspace{2cm}}$$

STEP 3: Set up a system. _____ = _____

$$\underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Then Solve: [HINT: Use Elimination]

STEP 4: Write Partial Fraction Decomposition:

Complete #9 on Decomposition Worksheet

➤ ASSIGNMENT: Partial Decomposition Worksheet #10, 13, 14, 27 - 29, 33, 39, 40