Section 8.4 Integration using partial fractions

When integrating fractions,

I. If denominator is one term and numerator is multiple terms, divide fraction into multiple fractions.

Example: $\int \frac{2x+1}{2x}\,dx$

II. If denominator is multiple terms

A. and power of numerator is equal or larger than denominator, use long division to turn improper fraction into a mixed number.

Example: $\int \frac{x^2+3x-6}{x-2}\,dx$

B. If power of denominator is larger, rewrite the rational function as a sum of simpler fractions.

Review: $\frac{5}{x-3} - \frac{3}{x-2} =$

We want to go backwards.

$$\int \frac{8x-19}{x^2-5x+6}\,dx$$

Repeated Linear Factors:

Each factor $(a-x)^m$ will be written $\frac{A}{a-x}+\frac{B}{(a-x)^2}+\frac{C}{(a-x)^3}+\cdots+\frac{D}{(a-x)^m}$

Example: $\int \frac{3x-9}{(x-1)(x+2)^2}\,dx$