MATH 3B

Discussion Worksheet - Thursday, May 17

Partial Fraction Decomposition:

- When do we use PFD?:

- How do I use the method of PFD?: We know how to compute the following integrals!

$$\int \frac{A}{x+d}\,dx = \qquad \int \frac{Ax}{x^2+d}\,dx = \qquad \int \frac{A}{x^2+d}\,dx =$$

- Strategy: Given a rational function of the form $p(x)/q(x)$ there are several cases to consider.

- How do we ensure Rule 1? We long divide polynomials, just like we did long division in 4th grade.

  Example: Rewrite $\dfrac{x^3-2x^2-4}{x^3-2x^2}$ so that it is written as a sum of rational functions with the degree of the numerator less than the degree of the denominator.

- Example: Find $\int \frac{x^3 - 2x^2 - 4}{x^3 - 2x^2}\, dx$ using your long division.

- Set Up the PFD for the following Special Cases:

  (1) $\int \frac{x^4 + 1}{x^5 - x^3}\, dx$ (2) $\int \frac{x^4 + 1}{x^5 - x^3}\, dx$ (3) $\frac{x^3 + x^2 + 1}{x(x-1)(x^2 + x + 1)(x^2 + 1)^3}$