

MATH 1B DISCUSSION WORKSHEET - 9/5/18

PARTIAL FRACTION DECOMPOSITION + INTEGRAL REVIEW

1. PARTIAL FRACTION DECOMPOSITION

$$\int \frac{x^2}{x^2 + 1} dx \qquad \int \frac{2x^3 - 1}{x^4 + x} dx \qquad \int \frac{dx}{e^x + 1}$$

2. ONE MULTI-STEP PROBLEM

[From *Calculus* by David Patrick.]

$$\int \frac{3}{x^3 - 1} dx$$

This problem takes a lot to get through! I used Partial Fraction Decomposition, u-substitution (hint: you may need to force this substitution into existence somehow!), Completing the Square, and Trig Substitution. (In that order, if it helps.)

3. INTEGRATION TECHNIQUES!

If you're looking for easier problems, do problems in Section 7.5 or in the Review section at the back of the chapter!

$$\int \frac{(x + 3)^2}{x} dx$$

$$\int \sin^2(2x) \sin(x) \cos^4(x) dx$$

$$\int \frac{x \sin(x)}{\cos^2(x)} dx$$

(Put LIATE to good use.)

[The next two are from the MIT Integration Bee, 2007]

$$\int (2 \ln x + (\ln x)^2) dx$$

$$\int \frac{x^{-1/2}}{1 + x^{1/3}}$$

(Hint: Section 7.4, Problem 45, from your homework.)