

INTRODUCTION TO CALCULUS

MATH 1A

UNIT 30: WORKSHEET

Partial Fractions

Problem 1: Integrate $\frac{1}{1+x}$.

Solution:
 $\ln(1+x) + C$.

Problem 2: Integrate $\frac{9}{(x-1)^2}$.

Solution:
 $-9/(x-1) + C$.

Problem 3: Integrate $\frac{7}{x^2+1}$.

Solution:

$$7 \arctan(x) + C.$$

Problem 4: Integrate $\frac{1}{(x+1)(x-1)(x+2)}$.**Solution:**

$$-(1/2) \ln(1+x) + (1/6) \ln(x-1) + (1/3) \ln(x+2)$$

Problem 5: Integrate $\frac{1}{1-x^4}$ **Solution:**

$$\text{Write as } (1/2)/(1-x^2) + (1/2)/(1+x^2) = (1/4)/(1-x) + (1/4)/(1+x) + (1/2)/(1+x^2) = -(1/4) \ln(1-x) + (1/4) \ln(1+x) + (1/2) \arctan(x).$$

Problem 6: Simplify $\frac{1}{3+2/x} + \frac{1}{x}$ then integrate it.**Solution:**

$$x/(3x+2) + x = (1/3)(3x+2)/(3x+2) - (2/3)1/(3x+2). \text{ The integral is } x/3 - (2/9) \ln(2+3x).$$