

# 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:**

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:**

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