

**MATH 253 (L02)**  
**MIDTERM HANDOUT**

1. Which of the following are partial fractions? Answer **YES** or **NO**.

a)  $\frac{2}{3-x}$

d)  $\frac{3x+1}{x^2-4x+3}$

b)  $\frac{2x+1}{x^3+8}$

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

c)  $\frac{3x+1}{x^2-4x+5}$

f)  $\frac{x^2}{x^2+4}$

2. Find the inverse function  $f^{-1}$ , the domain and range of  $f(x) = \arcsin(2x+3)$ .

3. Find the domain and antiderivative of  $f(x) = \frac{\ln(3x)}{x^2}$

4. Find the domain and antiderivative of  $f(x) = \frac{5x^2+2}{x^3-2x^2+x}$ .

5. (a) Is the integral  $\int_4^\infty \frac{dx}{x^2-9}$  convergent or divergent?  
If convergent, evaluate it.

(b) Is the integral  $\int_0^3 \frac{dx}{x^2-9}$  convergent or divergent?  
If convergent, evaluate it.

6. Evaluate  $\int_0^1 \frac{3}{2+\sqrt{3x+1}} dx$ .