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

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

a) $\dfrac{2}{3-x}$ ☐

b) $\dfrac{2x+1}{x^3+8}$ ☐

c) $\dfrac{3x+1}{x^2-4x+5}$ ☐

d) $\dfrac{3x+1}{x^2-4x+3}$ ☐

e) $\dfrac{3x+1}{(x^2-4x+5)^2}$ ☐

f) $\dfrac{x^2}{x^2+4}$ ☐

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

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

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

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

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

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