MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY. MAT 124 CAT 1

a. Write $\frac{x^2}{(x-2)(x^2+1)}$ into partial fractions, hence evaluate $\int \frac{x^2}{(x-2)(x^2+1)}dx$ **(5 Marks)**

b. Find $\int \sec(3x+\frac{1}{4})dx$ **(4 Marks)**

c. Decompose $\frac{4x^2+13x-9}{x^3+2x^2-3x}$ into partial fractions **(5 Marks)**

d. Evaluate the integral $\int e^x \cos x dx$ by parts. **(4 Marks)**

e. Find $3\int \frac{dx}{x^2+9}$ **(3 Marks)**

f. Define $I_n = \int \sin^n x dx$. Show that $I_n = \frac{-\sin^{n-1} x \cos x}{n} + \frac{n-1}{n}\int \sin^{n-2} x dx$. Hence or otherwise

evaluate $\int_0^{\frac{\pi}{2}} \sin^4 x dx$ **(9 Marks)**