May 23, 1995 Math. 102 Kuwait University Make-up 2nd Test Duration: 75 minutes Math. Dept Answer all of the following questions. Each part counts 5 points. Calculators and mobile phones are not allowed 1. Find the derivativ- of  $y = \log_{e^2} \left[ \log_5 \left( \sec^{-1} x \right) \right]$ at  $x = \frac{\pi}{2}$ 2. Evaluate the following integrals: (a)  $\int \sinh(\log x) dx$ (b)  $\int x \sec^{-1} x^2 dx$ Harri de pla (c)  $\int \frac{1 - \tan x}{1 + \tan x} dx$  $(d) \int \frac{\sin^3 x}{3 + \cos^2 x} dx$ والمام والم (e)  $\int x\sqrt{x-x^2}dx$ 3. Evaluate the following limits: (a)  $\lim_{x\to 0} \frac{\sinh x - \sin x}{\sin^3 x}$ مام قانم (b)  $\lim_{x \to 0} \tan^{-1} x \cot x$ Good Luck الم فاق