

Answer all questions. Cell phones and Calculators are NOT allowed.

1. Evaluate the following integrals : ( 3 points each )

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

(b)  $\int \frac{(x^2+2x-3)^{3/2}}{x+1} dx$

(c)  $\int \sin \sqrt{1-2x} dx$

(d)  $\int \frac{\csc^4 x}{\sqrt{\cot x}} dx.$

(e)  $\int \frac{x e^{x^2} dx}{1 + \cos(e^{x^2})}$

2. Determine whether the improper integral  $\int_{-\infty}^3 \frac{dx}{\sqrt{4-x}}$  is convergent or divergent , and if convergent find its value . ( 3 points )

3. Find the limit, if it exists :  $(3\frac{1}{2}$  points each)

(a)  $\lim_{x \rightarrow \infty} \frac{(\ln x)^2}{\sqrt{x}}$

(b)  $\lim_{x \rightarrow 0} \left( \frac{5^x + 2^{x+1}}{3} \right)^{1/x}$