

Math 182 Quiz 5 Version A

1. Find the following integrals:

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

(ii) $\int_1^{\infty} \frac{2 \arctan x}{1 + x^2} dx$

(iii) $\int_1^{\sqrt{5}} \frac{2w^2}{\sqrt{w^2 - 1}} dw$

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2. Show that p -series

$$\sum_{n=1}^{\infty} \frac{1}{n^p} = \frac{1}{1^p} + \frac{1}{2^p} + \frac{1}{3^p} + \cdots + \frac{1}{n^p} + \cdots$$

converges if $p > 1$ and diverges if $p \leq 1$.

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3. Determine whether the following series converge or diverge and explain your answer.

(i)
$$\sum_{n=1}^{\infty} \frac{(n+1)(n+2)}{n!}$$

(ii)
$$\sum_{n=2}^{\infty} \frac{\ln n}{n^2}$$

(iii)
$$\sum_{n=3}^{\infty} \frac{n}{(\ln n)^n}$$

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4. Find the volume of the solid formed by rotating the region bounded by $y = x^2 - 5x + 4$ and $y = 0$ about the y -axis.

5. Find the Taylor polynomial of order 3 generated by $f(x) = \frac{1}{1 + e^x}$ at $a = 0$.