

NAME: _____

Instructions: This is your fifth quiz. This quiz will **NOT** be multiple choice, but will be a traditional quiz.

Problem 1: For each of the following integrals indicate whether it is improper or proper. If the integral is improper please indicate why (i.e. “infinite interval, function diverges at $x = \sqrt{2}$, etc.”) You **NEED NOT** determine if these are convergent.

$$(i) \int_0^9 x^4 e^{-x^2} dx$$

$$(ii) \int_0^2 \frac{dx}{x^2 - 5x + 6}$$

$$(iii) \int_0^{\frac{\pi}{2}} \tan(x) dx$$

$$(iv) \int_0^{\infty} \frac{dx}{x^2 + 11}$$

Problem 2: Determine whether the integral

$$\int_0^{\infty} x^3 e^{-x^4} dx$$

is convergent or divergent. Explain clearly your reasoning in either case.

Problem 3: Is the sequence

$$a_n = \frac{n}{2n + 11}$$

convergent? If so find the limit. Explain clearly your reasoning in either case.

Problem 4: Is the sequence

$$a_n = \cos\left(\frac{n\pi}{2}\right)$$

convergent? If so find the limit. Explain clearly your reasoning in either case.