

MATH 142: EXAM 02

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Answer the questions in the spaces provided on the question sheets and turn them in at the end of the class period. Unless otherwise stated, all supporting work is required. It is advised, although not required, that you check your answers. You may **not** use any calculators.

Name: _____

1. PROBLEMS

1. (a) Compute $\int_{-\infty}^{\infty} xe^{-x^2} dx$

(b) Does the series $\sum_{n=0}^{\infty} ne^{-n^2}$ converge or diverge? Justify your answer.

- 2.** Express the decimal $0.\bar{9} = 0.999999\dots$ as a rational number. [Hint: Geometric Series.]

- 3.** Find the radius of convergence and the interval of convergence for the power series $\sum_{n=0}^{\infty} \frac{x^n}{\sqrt{n}}$.

Test the following series for convergence. You may use any of the tests we covered in class, however you **must indicate which test you use**.

4. $\sum_{n=1}^{\infty} \frac{n^2 - 1}{3n^4 + 1}.$

5. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{n^2}{n^3 + 4}$

6. $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{2^n}{n^2}$

7. $\sum_{n=1}^{\infty} \left(\frac{3}{n}\right)^n$