Grading guidelines for MAT2400, Spring 2022

General criteria

The exam will be graded on the scale of the Norwegian Mathematics Council adjusted to a total score of 110 points:

A: 110–100
B: 99-84
C: 83–63
D: 62–51
E: 50–44
F: 43–0

The scale may be adjusted if the exam turns out differently than expected, but it will not be adjusted in the students' disfavor.

Each problem (1a, 1b etc.) counts 10 points, except 4a and 4b which count 5 points each (these were originally intended as one problem, but it was easier to formulate them as two separate problems). A completely correct solution will receive 10 points, and an empty or worthless solution will receive 0 points. Unsubstantiated claims will receive 0 points unless they reveal a nontrivial understanding of the problem, but it is possible to earn 1-3 points for a clear mathematical formulation of what needs to be proved. We deduct 0-1 points for errors of calculation that seem to be due to sloppiness rather than a failure of understanding, and more for errors that reflect a lack of understanding. That the pass mark is 40% is often used as a guideline in assigning partial credit to a partially correct solution.

Some problems split naturally into subproblems, and the detailed criteria below specify the relative weight of these subproblems.

Detailed criteria

Problem 1. a) 6 points for computing a_n and b_n correctly. 4 additional points for explaining correctly and convincingly the transition from the formulas for a_n and b_n to the formula for the Fourier series.

b) The algebraic manipulations count 5 points. There are 5 additional points for explaining that the sum of the Fourier series equals the function value: 2 points for realizing that this is a problem that needs to be addressed and another 3 for solving it correctly.

Problem 2. a) 5 points for setting up the limit problem, 5 additional points for computing the limit correctly.

b) 4 points for a clear and correct statement of what has to be shown. 6 points for carrying out the argument.

Problem 3. 7 points for a correct argument, 3 additional points for a counterexample.

Problem 4. a) Deduct 2 points for getting an equality (Parseval's theorem) instead of an inequality (Bessel's inequality).

b) Deduct up to 2 points for failing to mention the possibility of nonuniqueness.

c) 7 points for proving the existence of $\mathbf{v}$, 3 additional points for showing that the Fourier components are equal.

Problem 5. a) Up to 5 points for an informal argument that shows a good grasp of the problem.

b) The properties (i), (ii), and (iii) are worth 3, 3, and 4 points respectively.

c) 3 points for graphing the functions and showing that $\|e_n - e_m\| = 1$. 7 additional points for showing that B isn't compact.

d) 6 points for solving the problem correctly, except for the condition $\lim_{x\to\infty} f(x) = 0$.