Mate 3063 practice problems

Lacking any further indication, mere mention of a section means: "solve all syllabus problems from this section".

For 21/08
§12.6. Ignore the activities, as they refer to a certain kit which we are not using.

For 26/08
§14.1

For 7/9
§14.2: problems from syllabus. The definition of limit using the two-player game is equivalent to Definition 1 on p. 917. Using the definition (2-player game), solve these three additional exercises:

(a) Show that $f(x, y) = mx$ has limit 0 at $(x, y) = (0, 0)$. m is a fixed scalar.

(b) Show that $g(x, y, z) = my$ has limit 0 at $(0, 0, 0)$.

(c) Show that $x + y$ has limit 0 at $(0, 0)$. For this, use the inequality $|x + y| \leq \sqrt{2}\sqrt{x^2 + y^2}$, which holds for any numbers x, y.

In each case, you must find ρ, radius of the disc (or ball, for problem (b)), in terms of r, radius of the interval. Write up the solution, making complete sentences.

For 17/9
§14.3.

For 22/9
§14.4. How do you approach exercise 35?

Additional exercise: prove the inequality of exercise (c) of the set 7/9. Hint: if $a, b \geq 0$, then $a \leq b$ is equivalent to $a^2 \leq b^2$.
Can one replace $|x + y|$ in the inequality by $|x| + |y|$? If yes, what is the direct consequence as to the limit of a certain function as $(x, y) \to (0, 0)$?

For 28/9
§14.5.

For 2/10
§14.6. Exercises starting at number 51 are substantial. They make good quiz and test problems, and are not to be neglected.

For 16/10
§14.7, omitting 30–35 since we did not cover this section. What are the dimensions of the cheapest aquarium in terms of V?

For 26/10
§15.1, 15.2.

For 28/10
§15.3. The integrand in exercise 58 can be evaluated exactly by repeated integration by parts, but this is not what the problem asks you to do.

8/11 As an exercise in self-assessment, count the number of practice exercises assigned so far, and ask yourself what proportion of these have you attempted in earnest. To help you break down the work, I will post, along with each set, a subset dubbed "instructor's choice". This means that the first quiz problem drawn from the corresponding section is likely to be (up to slight change) one of these exercises. Further quiz or exam problems from this section may belong to this restricted set, or simply to the larger set from the syllabus. This means that webwork problems are not a substitute for the chosen syllabus exercises, and the "choice" exercises are not quite a substitute for the complete set of syllabus exercises. In addition, good exam problems tend to integrate material across different sections.

For 10/11
§15.4. Instructor's choice: [1-6], 7, 11, 15, 24, 25, 30, 35, 39.

For 18/11
§15.7. Instructor's choice: 5, 13, 18, 19, 23, 30, 35, 37, 38.

For 20/11
§16.1. Instructor's choice: all exercises from syllabus, as they are not very substantial.
§16.5. In particular (instructor's choice): 6, 7, [9-11] 12, 18, 19, 25, 26, 31.

Practice for final.
§16.6. Ignore formula 9 p. 1130, and use def 6 instead.
§16.7. Ignore formula 10 p. 1142, and use formula 9 instead.
§16.9. Note that most of the problems use the theorem to compute a flux via the triple integral. Do any illustrate the reverse process (compute a triple integral by finding a flux)?