18.034 PROBLEM SET 11

This problem set is not for credit; do not hand it in! It is intended to give you a sampling of Laplace transform problems. You should try some from each section.

1. Problem 6.2.33, p. 305.

2. Problem 6.3.6, p. 311.

3. Problem 6.3.9, p. 311.

4. Problem 6.3.19, p. 311.

5. Problem 6.4.1, p. 318.

6. Problem 6.4.18, p. 319.

7. Problem 6.4.19, p. 319.

8. Problem 6.5.4, p. 324.

9. Problem 6.5.17, p. 325.

10. Problem 6.5.21, p. 325.

11. Problem 6.6.4, p. 330.

12. Problem 6.6.11, p. 331.

13. Problem 6.6.13, p. 331.

From Marsden's *Elementary Classical Analysis*, p. 275: "Around 1930, in his famous book *The Principles of Quantum Mechanics*, Dirac emphasized the usefulness of the δ-function ... At the same time as the physicists and engineers were computing, mathematicians sat back in quiet amusement, occasionally pointing out that this δ-function business was really all nonsense because no such function can exist. The definition does not really make sense, as anyone can plainly see. To add to the mathematician's enjoyment, Dirac proceeds to differentiate this function δ.

But the physicists turn out to have had a good idea after all. Today, distributions, of which δ is an example, are indispensible in the study of partial differential equations."

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