

This assignment is in two parts. The first part is due at the start of class on Day 15. It will not be collected, but you are expected to complete these exercises, just to practice basic skills. If you feel that you need more practice, then do more problems or talk to me.

15.1 Exercises 3, 11, 28-31, 38, 44.

The second part is due on paper at the start of class on Day 16. Submit polished solutions, including all necessary work and no unnecessary work, in the order assigned.

A. 15.1 Exercise 48. (The hardest aspect of this problem is keeping the notation straight.)

B. 15.1 Exercise 51. (Don't overlook parts D and E.)

C. Richard Feynman (1918-1988) was one of the most successful (and colorful) physicists of the 20th century. One of his favorite mathematical tricks was “differentiation under the integral sign”. In the simplest version, it is simply pushing a differentiation inside an integral with respect to a different variable:

$$\frac{d}{dx} \int_a^b f(x, y) dy = \int_a^b \frac{\partial}{\partial x} f(x, y) dy.$$

Use differentiation under the integral sign to compute  $\frac{d}{da} I(a)$ , where  $I(a)$  is defined at the start of Exercise 51. (Don't use the result of part E yet.) Does the answer agree with part E of that problem?