2.11.8: Footnotes

1. rhymes with “mouse”
2. Current is a scalar, since the definition $I = dq/dt$ is the derivative of a scalar. However, there is a closely related quantity called the current *density*, **J**, which is a vector, and **J** is in fact the more fundamentally important quantity.
3. As in chapter 2, we use the word “frequency” to mean either f or $\omega = 2\pi f$ when the context makes it clear which is being referred to.
4. I cheated a little. If z's argument is 30 degrees, then we could say $\bar{z}$'s was -30, but we could also call it 330. That's OK, because 330+30 gives 360, and an argument of 360 is the same as an argument of zero.
5. In general, the use of complex number techniques to do an integral could result in a complex number, but that complex number would be a constant, which could be subsumed within the usual constant of integration.
6. A resistor always turns electrical energy into heat. It never turns heat into electrical energy!
7. To many people, the word “radiation” implies nuclear contamination. Actually, the word simply means something that “radiates” outward. Natural sunlight is “radiation.” So is the light from a lightbulb, or the infrared light being emitted by your skin right now.
8. Note that this time “frequency” means f, not ω! Physicists and engineers generally use ω because it simplifies the equations, but electricians and technicians always use f. The 60 Hz frequency is for the U.S.
9. no relation to the human mathematician of the same name
10. Newton's human namesake actually proved this for gravity, not electricity, but they're both $1/r^2$ forces, so the proof works equally well in both cases.
11. The math gets messy for the off-axis case. This part of the proof can be completed more easily and transparently using the techniques of section 10.7, and that is exactly we'll do in example 37 on page 631.