16. In “deep water” (water depth greater than about 1/2 the wavelength), surface gravity waves obey the dispersion relation
\[ \omega = \sqrt{gk} \]
where \( g \) is gravity, \( \omega \) is the frequency, and \( k \) is the wavenumber. Show that for these waves, the wavelength is proportional to the square of the period. At what speed does a 10 m wave travel?

17. A former (after answering this question, you might understand why the word “former” appears) sea captain claims that during a stormy night in the North Atlantic he observed waves with wavelength of a few meters pass by his 50 m long boat in less than 3 seconds. Should you believe him?

17. Suppose you are in the middle of the ocean and observe a storm in the distance. Some time later you observe 5 m long waves passing by your boat. Two hours later you still see storm-generated gravity waves passing by your boat, but now their wavelength is only 2 m. How far away was the storm?