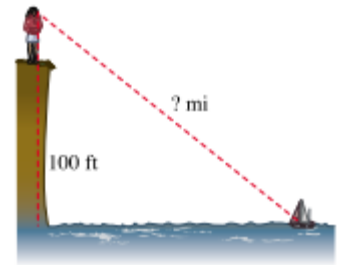


1. Did you ever stand on a beach and wonder how far out into the ocean you could see? Or have you wondered how close a ship has to be to spot land? In either case, the function $d(h) = \sqrt{2h}$ can be used to estimate the distance to the horizon (in miles) from a given height (in feet).

- a. Cordelia stood on a cliff gazing out at the ocean. Her eyes were 100 ft above the ocean. She saw a ship on the horizon. Approximately how far was she from that ship?



- b. From a plane flying at 35,000 ft, how far away is the horizon?

- c. Given a distance, d , to the horizon, what altitude would allow you to see that far?

2. A weight suspended on the end of a string is a *pendulum*. The most common example of a pendulum (this side of Edgar Allen Poe) is the kind found in many clocks. The regular back-and-forth motion of the pendulum is *periodic*, and one such cycle of motion is called a *period*. The time, in seconds, that it takes for one period is

given by the radical equation $t = 2\pi\sqrt{\frac{l}{g}}$ in which g is the force of gravity (10 m/s^2)

and l is the length of the pendulum.

- a. Find the period (to the nearest hundredth of a second) if the pendulum is 0.9 m long.

- b. Find the period if the pendulum is 0.049 m long.

- c. Solve the equation for length l .

- d. How long would the pendulum be if the period were exactly 1 s?

Solve each of the following applications.

3. The sum of an integer and its square root is 30. Find the integer.

4. The difference between an integer and its square root is 20. What is the integer?

5. The sum of an integer and twice its square root is 18. What is the integer?