The foot of the ladder in the figure below moves away from the wall at a speed of 2 ft/min, causing the top of the ladder to slide down the wall without leaving it. Label each of the following statements as True or False and give a reason.

(a) dx/dt and dy/dt have the same sign.
(b) The top of the ladder is moving faster and faster.
(c) Keeping dx/dt constant, doubling x, y, and the length of the ladder, doubles dy/dt.
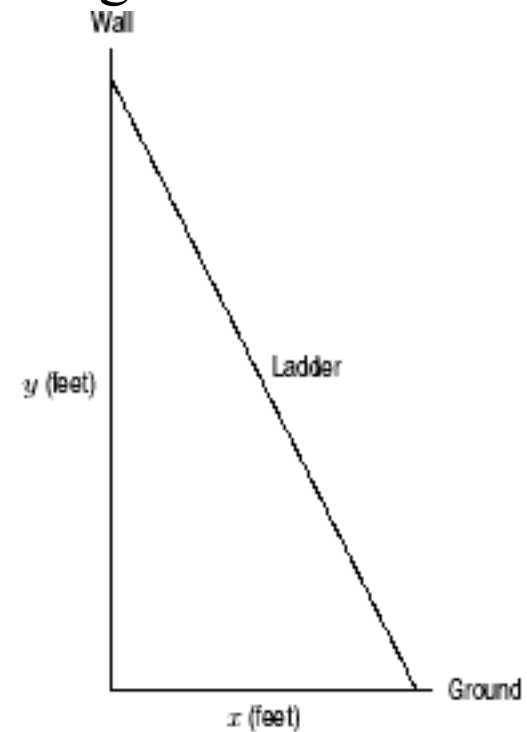

Figure 4.10

A spherical snowball of radius r cm has surface area S cm^2. As the snowball gathers snow, its radius increases as in the figure below. Approximately how fast, in cm^2/min, is S increasing when the radius is 20 cm?

(a) $4\pi \cdot 3^2$

(b) $4\pi \cdot 20^2$

(c) $4\pi \cdot 46^2$

(d) $8\pi \cdot 3 \cdot 2.5$

(e) $8\pi \cdot 20 \cdot 2.5$
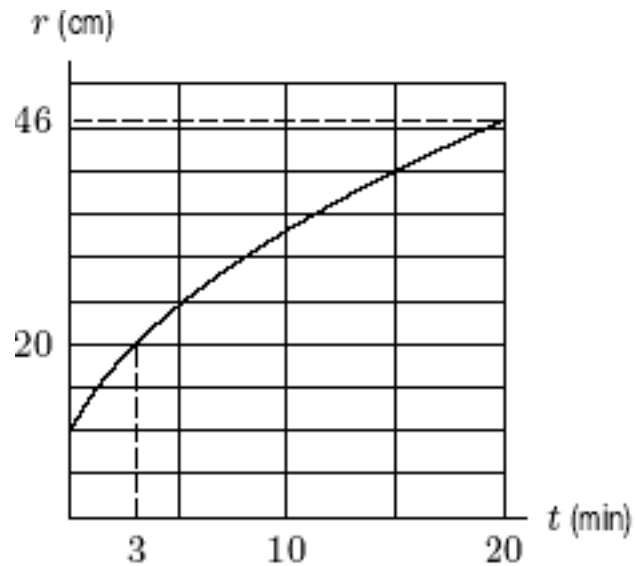
(f) $8\pi \cdot 46 \cdot 1$

Figure 4.8

The light in the lighthouse in the figure below rotates at 2 revolutions per minute. To calculate the speed at which the spot of light moves along the shore, it is best to differentiate:

(a) $r^2 = 5^2 + x^2$

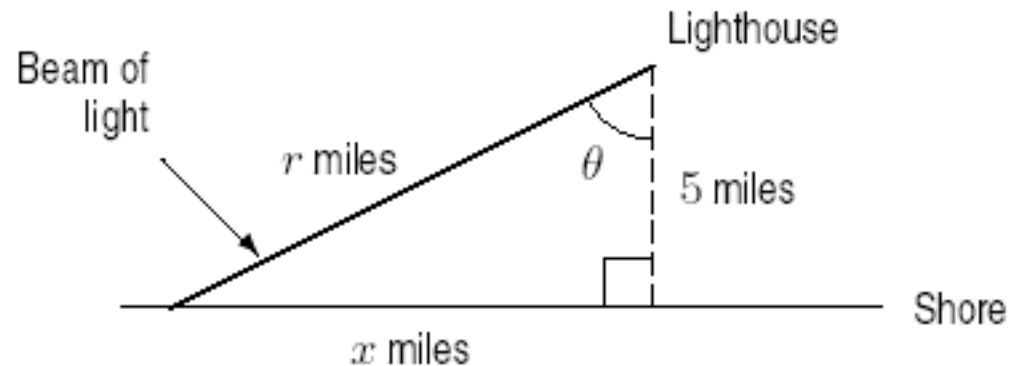(b) $x = r\sin\theta$

(c) $x = 5\tan\theta$

(d) $r^2 = 2^2 + x^2$

Figure 4.9