2. Calculate the sun angle for the following times and places:
   a. Millersville (latitude 40N) at 7 a.m. local on July 1.
      \[ \text{Answer: } h = 285^\circ, \delta = 23.3^\circ, \Theta = 26^\circ \]
   b. Keflavik, Iceland (latitude 64N) at 3 a.m. local on June 21.
      \[ \text{Answer: } h = 225^\circ, \delta = 23.5^\circ, \Theta = 4^\circ \]
   c. Thule, Greenland (76N) at 2 p.m. local on December 25.
      \[ \text{Answer: } h = 30^\circ, \delta = -23.4^\circ, \Theta = -11^\circ \]

3. A 1000 W flashlight shines directly on a floor in a parallel beam. The beam has a radius on the floor of 3 cm.
   a. Find the irradiance on the floor. \[ \text{Answer: } 3.53 \times 10^5 \text{ W/m}^2 \]
   b. The flashlight is tilted 30\(^\circ\) from the vertical. Now find the irradiance. (You will have to look up the formula for the area of an ellipse). \[ \text{Answer: } 3.06 \times 10^5 \text{ W/m}^2 \]
   c. The flashlight is tilted 60\(^\circ\) from the vertical. Now find the irradiance.
      \[ \text{Answer: } 1.77 \times 10^5 \text{ W/m}^2 \]