ESCI 340 – Physical Meteorology
Answers to Selected Exercises for Radiation Lesson 6

2. Calculate the sun angle for the following times and places:

   a. Millersville (latitude 40N) at 7 a.m. local on July 1.

      Answer: $h = 285°$, $\delta = 23.3°$, $\Theta = 26°$

   b. Keflavik, Iceland (latitude 64N) at 3 a.m. local on June 21.

      Answer: $h = 225°$, $\delta = 23.5°$, $\Theta = 4°$

   c. Thule, Greenland (76N) at 2 p.m. local on December 25.
      Answer: $h = 30°$, $\delta = -23.4°$, $\Theta = -11°$

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. **Answer:** 3.53×10^5 W/m^2

   b. The flashlight is tilted 30° from the vertical. Now find the irradiance. (You will have to look up the formula for the area of an ellipse). **Answer:** 3.06×10^5 W/m^2

   c. The flashlight is tilted 60° from the vertical. Now find the irradiance.
      Answer: 1.77×10^5 W/m^2