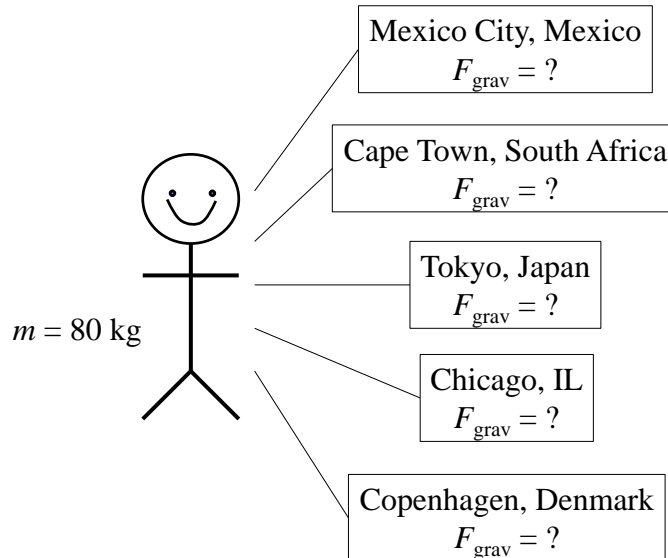**1.15** Using local acceleration of gravity data from the Internet, determine the weight, in N, of a person whose mass is 80 kg living in:

    (a) Mexico City, Mexico
    (b) Cape Town, South Africa
    (c) Tokyo, Japan
    (d) Chicago, IL
    (e) Copenhagen, Denmark

KNOWN: Person with a known mass living in multiple specified locations.

FIND: The person's weight in each location using local acceleration of gravity data from the Internet.

SCHEMATIC AND GIVEN DATA:

Mexico City, Mexico
$F_{grav} = ?$

Cape Town, South Africa
$F_{grav} = ?$

Tokyo, Japan
$F_{grav} = ?$

Chicago, IL
$F_{grav} = ?$

Copenhagen, Denmark
$F_{grav} = ?$

$m = 80$ kg

ANALYSIS:

(a) Mexico City, $g = 9.779$ m/s^2.

$$F_{grav} = mg = (80\,\text{kg})\left(9.779\,\frac{\text{m}}{\text{s}^2}\right)\left|\frac{1\,\text{N}}{1\,\frac{\text{kg}\cdot\text{m}}{\text{s}^2}}\right| = \underline{\mathbf{782.32\ N}}$$

(b) Cape Town, $g = 9.796$ m/s^2.

$$F_{grav} = mg = (80\,\text{kg})\left(9.796\,\frac{\text{m}}{\text{s}^2}\right)\left|\frac{1\,\text{N}}{1\,\frac{\text{kg}\cdot\text{m}}{\text{s}^2}}\right| = \underline{\mathbf{783.68\ N}}$$

(c) Tokyo, $g = 9.798$ m/s^2.

$$F_{\text{grav}} = mg = (80 \text{ kg})\left(9.798\frac{\text{m}}{\text{s}^2}\right)\left|\frac{1 \text{ N}}{1\frac{\text{kg} \cdot \text{m}}{\text{s}^2}}\right| = \underline{\textbf{783.84 N}}$$

(d) Chicago, $g = 9.803$ m/s^2.

$$F_{\text{grav}} = mg = (80 \text{ kg})\left(9.803\frac{\text{m}}{\text{s}^2}\right)\left|\frac{1 \text{ N}}{1\frac{\text{kg} \cdot \text{m}}{\text{s}^2}}\right| = \underline{\textbf{784.24 N}}$$

(e) Copenhagen, $g = 9.815$ m/s^2.

$$F_{\text{grav}} = mg = (80 \text{ kg})\left(9.815\frac{\text{m}}{\text{s}^2}\right)\left|\frac{1 \text{ N}}{1\frac{\text{kg} \cdot \text{m}}{\text{s}^2}}\right| = \underline{\textbf{785.2 N}}$$