

INTRODUCTION to BIOMECHANICS for HUMAN MOTION ANALYSIS, SECOND EDITION

SOLUTIONS to ODD-NUMBERED PROBLEMS

by

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INTRODUCTION (p. 12)

Conversion factors are taken from Table 1.3 on page 8.

1.

- (a) $350 \times 0.4536 \times 9.81 = 1557 \text{ N}$
- (b) $6.50 / 0.4536 = 14.33 \text{ lbs.}$
- (c) $168.5 \times 2.54 = 428 \text{ cm}$
- (d) $(10 \times 100) / 2.54 = 394 \text{ inches}$
- (e) $70.0 \frac{\text{miles}}{\text{hour}} \times \frac{1.609 \text{ km}}{1 \text{ mile}} \times \frac{1 \text{ hour}}{3600 \text{ s}} \times \frac{1000 \text{ m}}{1 \text{ km}} = 31.3 \text{ m/s}$
- (f) $80.0 \frac{\text{miles}}{\text{hour}} \times \frac{1.609 \text{ km}}{1 \text{ mile}} = 128.7 \text{ m/s}$
- (g) $8.35 \times 12 \times 2.54 = 255 \text{ cm}$
- (h) $440 \times 0.9144 = 402 \text{ m}$
- (i) $(800 / 0.9144) \times 3 = 2620 \text{ feet}$
- (j) $50.0 \times 1.609 = 80.5 \text{ km}$
- (k) $25.0 / 1.609 = 15.54 \text{ miles}$
- (l) $3.00 \times 9.81 = 29.4 \text{ newtons}$

3.

$$250 \frac{\text{lbs}}{1} \times \frac{0.4536 \text{ kg}}{1 \text{ lbs}} = 113.4 \text{ kg}$$

$$W = mg = 113.4 \times 9.81 = 1112.5 \text{ N}$$

Thus, the 1200 N person weighs more than the 250 lbs. person.

5.

$$45 \text{ ft.} = 45 \times 12 = 540 \text{ in.} = 540 \times 2.54 = 1371.6 \text{ cm} = 13.716 \text{ m}$$

Thus, 13.75 m is longer than 45 feet.