### Desired Body Weight (DBW)

DBW = LBW ÷ (1 – DBF%)

- **Step 1:** 100% – Fat % = Lean body %
- **Step 2:** Body weight x Lean body % = LBW
- **Step 3:** 100% – Desired fat % = Desired lean %
- **Step 4:** LBW ÷ Desired lean % = DBW

**Example:** 200-pound individual with 30% body fat; How much will he or she weigh at 25% body fat?
- 100% – 30% = 70%
- 200 pounds x 0.70 = 140 pounds LBW
- 100% – 25% = 75%
- 140 pounds ÷ 0.75 = 187 pounds DBW

### Waist-to-Hip Ratio (WHR)

Waist ÷ Hip = WHR

**Example:** Individual with 36-inch waist and 35-inch hip circumference

36 in ÷ 35 in = 1.03

### BMI Metric Formula

Metric Formula: Weight (kg) ÷ Height² (m)

- **Weight conversion:** weight in pounds ÷ 2.2 = weight in kg
- **Height conversion:** (height in inches x 2.54) ÷ 100 = height in meters

**Example:** BMI for a 5’ 8”, 196-pound individual

(5’ x 12) + 8 = 68”

196 ÷ 2.2 = 89 kg

(68” x 2.54) ÷ 100 = 1.73 m

89 kg ÷ (1.73 m x 1.73 m) = 30 (rounded up)

### BMI Standard Formula

Standard Formula:

\[
\text{BMI} = \frac{\text{[(Weight (lbs) x 703)]}}{\text{Height (inches)}}
\]

- Multiply weight (lbs) by 703
- Convert the height into inches: feet’ x 12” + inches’
- Divide (weight x 703) twice by the height in inches

**Example:** BMI for a 5’ 8”, 196 pound individual

- 196 lbs x 703 = 137,788
- 137,788 ÷ 68 inches = 2026.3 (rounded up)
- 2026.3 ÷ 68 inches = 29.7 = 30 (rounded up)

### Predicted 1 Repetition Max (1RM)

Pounds lifted ÷ % 1RM = Predicted 1RM

**Example:** Individual can perform maximum of 10 repetitions (10RM) with 150 pounds. What is his predicted 1RM?

10RM ÷ 0.75 = 1RM

150 pounds ÷ 0.75 = 200 pounds
**KARVONEN FORMULA - HEART RATE RESERVE (HRR)**

Step 1: 220 – Age = Predicted MHR  
Step 2: Predicted MHR – Resting Heart Rate = HRR  
Step 3: (HRR x % intensity) + RHR = THR

Example: 34-year-old, resting heart rate = 62 bpm, 75% of HRR  
- 220 – 34 = 186 bpm  
- 186 – 62 = 124  
- (124 x 0.75) + 62 = 155 bpm

---

**CALORIC (KCAL) VALUES PER GRAM (G)**

<table>
<thead>
<tr>
<th>Food Type</th>
<th>Calories per Gram</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fat</td>
<td>9 kcal/g</td>
</tr>
<tr>
<td>Alcohol</td>
<td>7 kcal/g</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>4 kcal/g</td>
</tr>
<tr>
<td>Protein</td>
<td>4 kcal/g</td>
</tr>
</tbody>
</table>

---

**TOTAL CALORIES AND PERCENTAGE OF CALORIES**

Nutrition label values: 36g carbohydrate, 11g protein, 8g fat  
Total Calories:
- Calories from carbs: 36g x 4cal/g = 144 calories  
- Calories from protein: 11g x 4cal/g = 44 calories  
- Calories from fat: 8g x 9 cal/g = 72 calories  
Total calories = 144 + 44 + 72 = 260 calories  
Percentage of Calories:
- Carb calories ÷ total calories = % of calories from carbohydrate  
  144 ÷ 260 = 55% (0.55) of calories from carbohydrate  
- Protein calories ÷ total calories = % of calories from protein  
  44 ÷ 260 = 17% (0.169) of calories are from protein  
- Fat calories ÷ total calories = % of calories from fat  
  72 ÷ 260 = 28% (0.276) of calories are from fat

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**DAILY CALORIC DEFICIT NEEDED TO ACHIEVE DESIRED WEIGHT LOSS IN SET TIMEFRAME**

1 pound body fat = 3,500 kcal  
Step 1: (Desired Weight Loss (pounds) x 3,500 kcal/pounds) ÷ # Weeks = Weekly Caloric Deficit (kcal/week)  
Step 2: Weekly Caloric Deficit (kcal/week) ÷ 7 days /week = Daily Caloric Deficit

Example: Individual wants to lose 15 pounds in 20 weeks; What daily caloric deficit is required to reach this goal?  
- (15 pounds x 3,500 kcal/pounds) ÷ 20 weeks = 2,625 kcal / week  
- 2,625 kcal/week ÷7 days/week = 375 kcal/day

For more help on using these formulas, check out our Fitness Math course at ACEfitness.org/FitnessMath. If you purchased a Premium Plus program, the course has automatically been added to your MyACE Account.