

## The Mathematics of Fitness

Select a square to view a topic.

Goal Body Weight Calculations

Heart Rate Calculations

Macronutrient Calculations

Metabolic Calculations

Final Quiz



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## Metabolic Calculations

### Overview

This section will review metabolic calculations including:

- Resting Metabolic Rate,
- Metabolic Equivalents (MET's),
- MET-Minutes,
- Oxygen Consumption, and
- Caloric Expenditure During Exercise.



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## Goal Body Weight Calculations

### Overview

This section will review biometric calculations including:

- Body Mass Index
- Waist-to-Hip Ratio
- Goal Body Weight



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## Goal Body Weight Calculations

### Goal Body Weight Calculations

A 40-year-old female client currently weighs 170 lbs. and has 32% body fat. She would like to decrease her body fat to 26% over the next six months.

What is her goal body weight?

170 lbs. x .32 = 54.4 pounds of fat weight  
170 lbs. - 54.4 = 115.6 pounds of lean body weight  
115.6 ÷ .74 (goal % LBW) = **156 lbs. (goal weight)**

Note: The goal % of lean body weight is found by taking the goal percent of body fat subtracted from 1, where 1 represents "100%" of the client's body weight.  
 $1 - .26 = .74$



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## Heart Rate Calculations

### Karvonen Formula

Rather than maximum heart rate, the **Karvonen** Formula utilizes the heart rate reserve to determine the desired exercise intensity. The **heart rate reserve (HRR)** is found by subtracting the resting heart rate from the HRmax. Next, the HRR is multiplied by the desired training intensity. Finally, the resting heart rate is added back in to this number to establish the target heart rate.



\*Karvonen, M.J., Kentala, E., & Mustala, O. (1957). The effects of training on heart rate: a longitudinal study. In *Annals Medicine Experimental et Biologiae Fenniae*, 35(3): 30-315.

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## Macronutrient Calculations

### Interpreting a Food Label

1 gram carbohydrate = 4 calories

Then the carbohydrates...

31 grams of carbs  
x 4 kcal/gram  
= 124 kcal from carbs  
÷ 250 total kcal  
= 49% kcal from carbs

Nutrition Facts	
Serving Size 1 cup (228g)	
Servings Per Container 2	
Amount Per Serving	
Calories 250	Calories from Fat 110
<b>Total Fat</b> 13g	<b>% Daily Value*</b>
Saturated Fat 3g	6%
Trans Fat 3g	6%
Cholesterol 30mg	10%
Sodium 170mg	35%
<b>Total Carbohydrate</b> 31g	<b>62%</b>
Dietary Fiber 1g	2%
Sugars 1g	2%
<b>Protein</b> 1g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%
*Percent Daily Values are based on a diet of other people's secrets.	
Your daily values may be higher or lower depending on your calorie needs.	
	Calories
Total Fat	13g
Sat Fat	3g
Cholesterol	30mg
Sodium	170mg
Total Carbohydrate	31g
Dietary Fiber	1g

Using the number of carbohydrate grams per serving, calculate the number of carbohydrate calories and then the % of total calories coming from carbohydrates.



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