

Formulas for Calculating Calories Burned Based on Heart Rate During Exercise

ORIGINAL FORMULA IN KEYTEL PAPER (Metric Units):

Energy Expenditure (in kilojoules per minute) = gender x (-55.0969 + 0.6309 x heart rate + 0.1988 x weight (in kg) + 0.2017 x age + (1 - gender) x (-20.4022 + 0.4472 x heart rate - 0.1263 x weight (in kg) + 0.074 x age).

Where with gender = 1 for males and 0 for females

Simplified version

Men: EE (in kilojoules per minute) = -55.0969 + 0.6309 x heart rate + 0.1988 x weight (in kg) + 0.2017 x age

Women: EE (in kilojoules per minute) = -20.4022 + 0.4472 x heart rate - 0.1263 x weight (in kg) + 0.074 x age.

ENGLISH/U.S. UNITS

1 kilojoule = 239 calories (small calories) = 0.239 Kcal = 0.239 Calories (big Calories/US. food Calories)

2.2 kg = 1 lb

For Women:

Calories = (-20.4022 + (0.4472 x heart rate) - (0.05741 x body weight in lbs) + (0.2017 x age)) x duration of workout (in minutes)/4.184.

Note: The entire highlighted section would be calculated first and then divided by 4.184.

For Men:

Calories = (-55.0969 + (0.6309 x heart rate) + (0.0904 x weight (in kg) + (0.2017 x age)) x duration of workout (in minutes)/4.184.

Note: The entire highlighted section would be calculated first and then divided by 4.184.

An online calculator that uses the above formulas to calculate calories burned from exercise is available at this website: <http://www.shapesense.com/fitness-exercise/calculators/heart-rate-based-calorie-burn-calculator.shtml>

This webpage linked above also includes a calculator that uses the VO2 max formula from the Keytel study so you can compare results when you factor VO2 max into the calculations. Once you do that, you can see a significant difference for women in the number of calories burned based on body weight versus the non-VO2 max calculation.

This website also has a simple calculator that can be used for estimating an individual's VO2 max for use in the VO2 max included formula: <http://www.shapesense.com/fitness-exercise/calculators/vo2max-calculator.shtml>