Your *basal metabolic rate* (BMR) is the number of calories you expend per day while in a state of rest. BMR decreases with age and increases with the gain of lean body mass.

To determine your BMR accurately, you need a fairly sophisticated test. However, there are several formulas for approximating your BMR. Here is one that was developed by Mark Mifflin and Sachiko St. Jeor in 1990.

Incoming   Outgoing

Activity

Intake   BMR

If your incoming calories are equal to your outgoing calories, you should maintain your weight. To lose weight, decrease your incoming calories and/or increase your outgoing calories. To gain weight, do the opposite.

Formula for Basal Metabolic Rate (BMR) in Calories Per Day

Factor 1: $4.545 \times$ weight (lb)
Factor 2: $15.875 \times$ height (in.)
Factor 3: $5 \times$ age (yr)
Factor 4: 5 for males and -161 for females

BMR = Factor 1 + Factor 2 $-$ Factor 3 + Factor 4

EXAMPLE 4   **Using a Basal Metabolic Rate**

To determine your daily calorie needs, you must multiply your basal metabolic rate by a number determined by your activity level.

Weight: 198 lb
Height: 72 in.
Age: 32 yr

Outgoing Calories	
Activity level	**BMR multiplier**
Sedentary	1.200
Lightly active	1.375
Moderately active	1.550
Very active	1.725
Extra active	1.900

Incoming Calories	
Food	**Calories per gram**
Carbohydrate	4
Protein	4
Fat	9
Alcohol	7

Assume the man shown is very active and his daily calorie intake is about 3500 calories. Would you expect him to be losing weight or gaining weight? Explain your reasoning.

SOLUTION

DATA

	A	B	C
1			**Factor**
2	Weight	198	900
3	Height	72	1143
4	Age	32	160
5	Gender	M	5
6			
7	BMR		1888
8	Activity level	VA	1.725
9	Outgoing calories		3257
10			

Incoming calories: 3500
Outgoing calories: -3257
Balance: 243

The man should be gaining weight.

✔ **Checkpoint**

Help at *Math*.and**Y😊U**.com

Find your daily calorie balance.