

## 1 MILES PER GALLON (SCORE: 4)

Assume that you currently drive an older car that drives 10 miles per gallon of gas. Given the estimated miles you would drive per year with a new car and the mpg for the new car, determine the estimated savings in gas expenses. Prompt the user for the expected gasoline price, the miles, and mpg for the new car. Display the estimated savings.

**Example:**

**Enter cost of gas: 2.699**

**Enter number of miles: 15000**

**Enter new mpg: 35**

**Estimated savings per year: 2,891.79**

## 2 CRYPTOGRAPHY (SCORE: 8)

Cryptography is about protecting information. Early schemes involved switching letters. A common approach was using an encoding wheel that “moved” every letter the same number of letters down in the alphabet. The letters on the wheel “wrap around” (a follows z). Write a program that accepts an integer n and a word less than 10 letters long. Print out the encoded word with every letter replaced by the nth successor.

**Example1:**

**input: 1 example**

**output: fybnqmf**

**Example 2:**

**input: 25 peanut**

**output: odzmts**

## 3 TILES COVERING TRIANGLE (SCORE: 12)

Assume that you covering a triangular-shaped area with tiles that are 10 X 10 inches. The area is an equilateral triangle. The tiles will be arranged in rows with one row aligned with one of the sides. Call this side the base. The height of an equilateral triangle is .866 times the base. The tiles are directional so that when a tile is cut to fit the slope on one edge, the remaining piece of tiles cannot be used anywhere else. The vertical edges do not have to be aligned. Given the length of the base, calculate the minimum number of tiles that are needed to completely cover the area.

**Example 1:**

**Enter length of a side: 10**

**Number of tiles: 1**

**Example 2:**

**Enter length of a side: 50**

**Number of tiles: 15**

