

Q4. Volume of Balloon (10 marks):

Charles's Law says that for a given amount of gas at fixed pressure, the volume and temperature are directly proportional. Mathematically, it can be written as $V \propto T$, where V is the volume in m^3 and T is the temperature in Kelvin (K). In an experiment, a hot air balloon has a volume of 2800 m^3 at the temperature of 99°C . Your task is to determine the volumes of the balloon for various temperatures.

Note: The formula to convert a temperature from Celsius to Kelvin is

$$T_{\text{Kelvin}} = T_{\text{Celsius}} + 273.15$$

Write a programme to

Input, in sequence,

A positive integer, n , where $1 \leq n \leq 10$, to indicate the number of data to be read subsequently. n lines of data; for each line, a temperature in Celsius is given, where $T_{\text{Celsius}} \geq -140.23928$.

Output, in sequence, the volumes of the hot air balloon corresponding to the temperatures given in the input. Your answers should be rounded to 7 decimal places.

试题 4. 气球的体积 (10 分):

根据查理定律 (Charles's Law) 当压力不变时, 给定气体的体积和温度成正比。数学上, 我们可以写成 $V \propto T$, 其中 V 是该气体的体积 (单位为 m^3) 以及 T 是当时的开氏 (Kelvin) 温度 (单位为 K)。在一项实验中, 一个热气球被量测出在摄氏 (Celsius) 99°C 时, 其体积为 2800 m^3 。你的任务是找出此热气球在不同温度下的体积。

注意: 从摄氏温度转换为开氏温度的公式为

$$\text{开氏温度} = \text{摄氏温度} + 273.15$$

试写一程式以

依序输入

一个正整数 n , 其中 $1 \leq n \leq 10$, 表示接着程式将读取 n 行的数据。

n 行的数据, 每一数据表示一个摄氏温度, 其中摄氏温度 ≥ -140.23928 。

依序输出 此热气球在上述给定温度下的体积。你的答案必须近似至小数点后七位数。

Example (例子)

Input (输入)	Output (输出)
1 80	2657.0468897
1 -140.23928	1000.0000430
2 -100 -10	1302.7542658 1979.9005777
3 10 20 30	2130.3775359 2205.6160150 2280.8544942
4 -40.567 56.876 -0.87 1	1749.9191186 2483.0654306 2048.5933091 2062.6629047

All Test Cases (所有测试用的例子)

Sample Input	Sample Output
1 80	2657.0468897
1 -140.23928	1000.0000430
2 -100 -10	1302.7542658 1979.9005777
2 100 -50	2807.5238479 1678.9466613
3 10 20 30	2130.3775359 2205.6160150 2280.8544942
4 -40.567 56.876 -0.87 1	1749.9191186 2483.0654306 2048.5933091 2062.6629047
5 0 -140.239297 0 -1 140.239297	2055.1390568 999.9999151 2055.1390568 2047.6152089 3110.2781986
10 -99.99 -88 -7.678 -0.123 -0.00001 3.456 67.891 78.90 88.88 95.678	1302.8295042 1393.0404407 1997.3709526 2054.2136235 2055.1389816 2081.1414752 2565.9406153 2648.7706570 2723.8586591 2775.0057772