

1. Making Tea (tee)

1 second

20 points

You're making tea and have just heated a kettle of water to 100 degrees. You already know you want to make tea again in exactly one hour, and will need some water at 100 degrees then as well.

You have a smart kettle which can both heat water and keep it hot. Water that is not kept hot will start to cool. It cools until it reaches room temperature, which is 22 degrees in your room, and then remains at that temperature until it is heated again. However, keeping the water hot also takes some energy.

Write a program to compute the amount of energy required to keep the water hot, and the amount of energy required when letting the water cool down and re-heating it later.

Input. The only line of input contains four space-separated real numbers A , B , C , and D .

- A ($0 < A \leq 100$) is the amount of energy, in kJ, needed to heat the water in the kettle by one degree.
- B ($0 < B \leq 3600$) is the number of seconds it takes to heat the water by one degree.
- C ($0 < C \leq 100$) is the amount of energy, in kJ, needed each minute to keep the water in the kettle hot. You can ignore this during heating.
- D ($0 < D \leq 100$) is the number of degrees by which the water in the kettle cools each minute when it's not kept hot. You can ignore this during heating.

Output. Output two lines.

The first line should contain one number: the amount of energy needed to keep the water hot until you make tea again. The value may differ from the correct answer by at most 0.01.

The second line should also contain one number: the amount of energy needed if you let the water cool down and heat it back up to 100 degrees before making tea again. The value may differ from the correct answer by at most 0.01.

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| Example. | Input | Output |
| | 5 10 3 2 | 180 390 |

It would take 180 kJ to keep the water hot for an hour. If you let the water cool, it would reach room temperature in 39 minutes and could remain at that temperature for 8 minutes, to be heated back to 100 degrees in 13 minutes, which is 780 seconds, taking 390 kJ.

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| Example. | Input | Output |
| | 4.186 15.7 2.31152 0.42 | 138.691 95.0421 |

It would take about 138.69 kJ to keep the water hot for an hour. If you let the water cool down, you could let it cool for about 54.059 minutes, reaching a temperature of about 77.295 degrees. Then you would need to start heating it again, so that it would get back to 100 degrees in about 5.941 minutes, taking about 95.04 kJ.

Grading. In test cases worth 10 points in total, it is known that if you let the water cool down, it would reach room temperature before you would need to start heating it again. In test cases worth the remaining 10 points, there are no additional constraints.

In each test case, you will get half of the points if the number on the first line is correct. For full points, both numbers must be correct.