

Jumping Hands

In Shanghai, there are some famous clock towers built more than 100 years ago, such as the office building of Shanghai Customs, Xujiahui Church, etc. Every clock tower's clock-face consists of three hands: an hour hand, a minute hand, and a second hand. The hands are not move smoothly as time passing. When a second passes, the hands jump to the next place clockwise: the second hand moves $1/60$ ring, the minute hand moves $1/3600$ ring and the hour hand moves $1/43200$ ring.

We assume that every hand's mass is evenly distributed, and its thickness can be ignored. In other words, every hand's centre of gravity is at the middle position of the respective hand. Suppose p_1 , p_2 and p_3 are, respectively, the position of the centre of gravity of the hour hand, that of the minute hand, and that of the second hand. The position of all three hands' centre of gravity, P , is the average of p_1 , p_2 and p_3 weighted by the hands' mass.

Suppose P_1 and P_2 are the positions of the three hands' centre of gravity at the start time and at the end time, respectively. Your task is to calculate the length of the path from P_1 to P_2 . That is, if P_3 is the position of the three hands' centre of gravity on the clock-face at a point of time between start time and end time, X is the length of the path from P_1 to P_3 , and Y is the length of the path from P_3 to P_2 , the length of the path from P_1 to P_2 is $X+Y$.

Input

Input consists of one or more lines, each line describing one data set. Each line begins with 6 integers: L_1 , L_2 , L_3 , M_1 , M_2 , M_3 , followed by start time and end time. L_1 , L_2 and L_3 indicate the lengths of hour hand, minute hand and second hand respectively, where $1 \leq L_1 < L_2 < L_3 \leq 100$. M_1 , M_2 and M_3 indicate the weights of hour hand, minute hand and second hand respectively, where $1 \leq M_1, M_2, M_3 \leq 100$. The format of start time and end time is *hh:mm:ss*, where $0 \leq hh \leq 23$, $0 \leq mm \leq 59$, and $0 \leq ss \leq 59$. Start time and end time should be in the same day.

End of input is indicated by a line consisting of -1.

Output

For each data set, output a single line. Each line should give the length of the path for the positions of three hands' centre of gravity at the start time and at the end time. We accept solutions with absolute error less than 10^{-2} .

Example

Input:

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1 2 3 1 2 3 00:00:00 00:00:01
3 4 5 1 1 1 09:00:00 18:00:00
-1
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Output:

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0.08
2826.27
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