Problem 4—I Shot An Arrow

If Katniss Everdeen is to win the Hunger Games, she will have to shoot a bunch of the other tributes with her bow and arrow because that's pretty much her only skill. The problem with shooting with a bow and arrow is that the tributes aren't frequently standing still; they're moving, and so Katniss has to aim her arrow to where the tribute will be when the arrow hits him.

For this problem, imagine that Katniss and the victim are both points on the Cartesian plane whose unit distance is one foot. Katniss launches the arrow into the air at an angle. The arrow is also a point and will fall to earth with the gravitational acceleration of 32 ft/sec^2. No matter what angle Katniss launches the arrow, the arrow's horizontal speed is *always* 200 ft/sec. The other tribute moves at a constant speed and trajectory given in the input. All trajectory angles are measured in the standard fashion, counterclockwise from the positive *x*-axis, so that 0° is east, 90° is north, 180° is west, and 270° is south. Assuming Katniss fires at the same time that the other tribute starts running, what are the angles at which she must fire in order for the arrow to strike the ground at the exact point and at the exact time that the other tribute is there?

INPUT SPECIFICATION. The input is divided into a number of cases. Each case will consist of a series of positive unsigned integers separated by one space. The numbers are: the *x*-coordinate of the other tribute, the *y*-coordinate of the other tribute, the speed of the other tribute in ft/sec (always less than 200), the angle (in degrees) indicating the direction in which the other tribute is running, Katniss's *x*-coordinate and Katniss's *y*-coordinate. Each case will be followed by **<EOLN>**.

OUTPUT SPECIFICATION. The output cases should be in the same order as the input cases. Each output case should be of the form "Case *c*: Katniss fires at a horizontal angle of *h* degrees and a vertical angle of *v* degrees." where *c* is the case number, $0 \leq h < 360$ is the angle measured counterclockwise from the positive *x*-axis, and $0 < v < 90$ is the angle measured upward from the ground. Both angles should be printed with one digit to the right of the decimal point, rounded to the nearest tenth of a degree. Each case will be followed by **<EOLN>**.

SAMPLE INPUT.

```
100·0·25·90·0·0<EOLN>
100·0·0·0·0·0<EOLN>
<EOF>
```

SAMPLE OUTPUT.

```
Case·1:·Katniss·fires·at·a·horizontal·angle·of·7.2·degrees·and·a·vertical·angle·of·2.3·degrees.<EOLN>
Case·2:·Katniss·fires·at·a·horizontal·angle·of·0.0·degrees·and·a·vertical·angle·of·2.3·degrees.<EOLN>
<EOF>
```