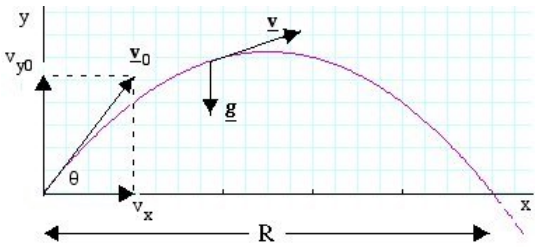
Back to HSC Physics Maximum Horizontal Range of a Projectile

When a particle is projected from the ground it will follow a curved path, before hitting the ground. How far the particle travels will depend on the speed of projection and the angle of projection. The range (R) of the projectile is the horizontal distance it travels during the motion. So that the vertical distance is zero when it hits the ground.



So that,

$$y=(\tan\theta_0)\,x-\frac{g}{2(v_0\cos\theta_0)^2}x^2$$

replacing x by R

$$0=(\tan\theta_0)\,R-\frac{g}{2(v_0\cos\theta_0)^2}R^2$$

$$R=\frac{(\tan\theta_0)\times 2(v_0\cos\theta_0)^2}{g}$$

$$R=\frac{2v_0^2\sin\theta_0\cos\theta_0}{g}$$

$$R=\frac{v_0^2\sin 2\theta_0}{g}$$

Now write a Program to determine Maximum Horizontal Range, **R** max of a Projectile.

Input Format

Input may be sevaral test case. Each test case shoud read a Initial motion of Projectile, V0. the program be terminated by End of File.

Constraints

0 < V0

Output Format

For each valid input print the Maximum Horizontal Range, **R** max

Sample Input 0

```
11.45
```

```
12.55
13.65
14.75
15.85
```

Sample Output 0

```
13.38
16.07
19.01
22.20
25.63
```

Explanation 0

g = 9.8 m/s & theta = Pi/4