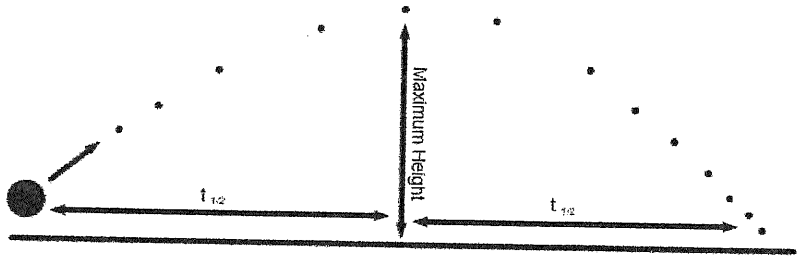
Projectile Motion Angular

How do I calculate the time the object is in the air?



Acceleration X: _____ Y: _____

Initial Velocity X: _____ Y: _____

1. A rock is launched at 20^{u} with a velocity of 35m/s.

   Step 1: Break apart the vector into its individual X/Y components (Level 1)

$35\cos(20) = 32$ m/s

$35\sin(20) = 11.9$ m/s

Time in the air is normally one of the first things we need to know!

X: Determines distance traveled

Y: Determines the time in the air and height at specific times.

Step 2: How much time is the rock in the air?

$V_f = V_i + at$ $\quad 0 = 11.9 + -9.8(t)$

$t_{1/2} = 1.21 \times 2 =$ 2.42 sec

Method 1: Utilizing the fact that the Y component velocity is zero at the peak.

top = zero

$V_f = V_i + at$

$0 = 11.9 + -9.8t$

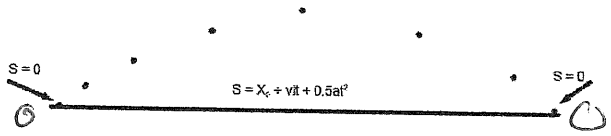
Y velocity

$t = 1.21$ sec

$\times 2 = 2.42$

1.21 1.21 sec

Method 2: Utilizing the distance formula to solve for X_t = zero. At what time is the rock at location of zero. The answer is twice. At the beginning and at the end.



Solving for t, when S = 0 will require a quadratic and will give 2 answers, one for each time it is at the zero point.

$X_f = X_i + V_i t + \frac{1}{2}at^2$

$0 = 0 + 11.9t + -4.9t^2$

C B A

Use Quadratic

$t = 2.42$ sec.