



Lesson 2: Calculation of Rocket/Asteroid Rendezvous

If we know the steady speed of the asteroid and the rocket, as well as the distance between their original points and the destination point, we can calculate exactly when to launch the rocket in order to make contact with the asteroid.

Doing the Science

1. Start the Bot Miner Simulation.
2. Select the “Calculation” option on the main screen.
3. Move the cursor over each asteroid and record their speeds in column B of Table 1 below.

Table 1. Asteroid Data

Asteroid	A. x-length (km)	B. Asteroid Speed (km/hr)	C=A/B	D. y-height (km)	E. Rocket Speed (km/hr)	F=D/E
Alpha (α)	600,000			40,000		
Beta (β)	600,000			30,000		
Gamma (γ)	600,000			20,000		
Delta (Δ)	600,000			10,000		

4. Next, record the constant bot miner rocket speed in Column E of Table 1.
5. Using the equations provided in Table 1, calculate C and F for each asteroid and record your answers in the appropriate columns.

What Do You Understand?

1. Subtract F from C for any row and enter it into the blank slot on the screen of the simulation for Hours. Launch your rocket. Did your rocket land on an asteroid?

2. Construct an explanation as to why your rocket was or was not successful in landing on the asteroid.

3. What quantities are you calculating in columns "C" and "F?"

4. What is the correct unit of measurement for columns "C" and "F" values?

5. Describe an event where a spaceship rendezvous with another object is desired.

6. If launched at the same time, which would get to the destination first, the asteroid delta or the rocket? Support your response with a reason.
