The little prince's asteroid B612 is being orbited by a small body.

It has a mass m.

And it goes around this asteroid B612 that has a mass m1.

We should add a coordinate system.

We always know about r-hat goes radially outward.

And we know from the universal law of gravitation that we have mutual attraction between these bodies.

And actually, that's going to point inward.

And because we're having orbital motion here, so circular motion, the acceleration, the radial component of the acceleration will also point inward.

We need to consider all of that for our f equals ma analysis that we are going to do now, because the little prince wants to know how far this little body is away from his asteroid.

So we have the gravitational universal law here, minus Gmm1 over the distance squared.

So the distance here between the two planets, r, which is what we want to calculate.

And then we have over here for circular motion, the description of mr omega squared.

Now, the little prince can't measure omega.

But the little prince has a little time clock.

So what he can measure is the period from here until he sees the body again.

And that is 2pi over omega.

So we can add that in here.

mr 4pi squared over T squared.

And this m here will cancel out.

And we have to solve this for r.

What we're going to see-- Oh and of course, we have a minus sign here because in the life of the little prince, of course gravitational acceleration is not going outwards.

It's going inward, so we better give this a minus here and here as well.

And we will actually see that that then cancels out against this one.

And we're going to solve this for r.

So we get r cubed, actually.

And then we have Gm1 over 4pi squared.

And here, we have T squared.

And you can also just write that as Gm1 or pi squared T squared.

And then we have third root.

So you might have seen this equation here.

This is actually Kepler's law.

It describes the motion of the planets around the sun.

Well, it really only does it if the motions are fairly circular.

For elliptical orbits, it is not such a good approximation, although Kepler derived it like that quite a while ago.

And that was really an astonishing result.

So here, we have this again that the cube of the distance between two objects is proportional to the square of the period of the orbiting time.