

# Calculus

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## equations

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Acceleration is defined to be :

$$a = \frac{d^2x}{d^2t}$$

Since we are going to use simple forward method to calculate the orbit, we have to divide this second- order differential equation into :

$$a = \frac{dv}{dt}$$

$$v = \frac{dx}{dt}$$

Then we can know that :

$$v_{n+1} = v_n + dt \times a$$

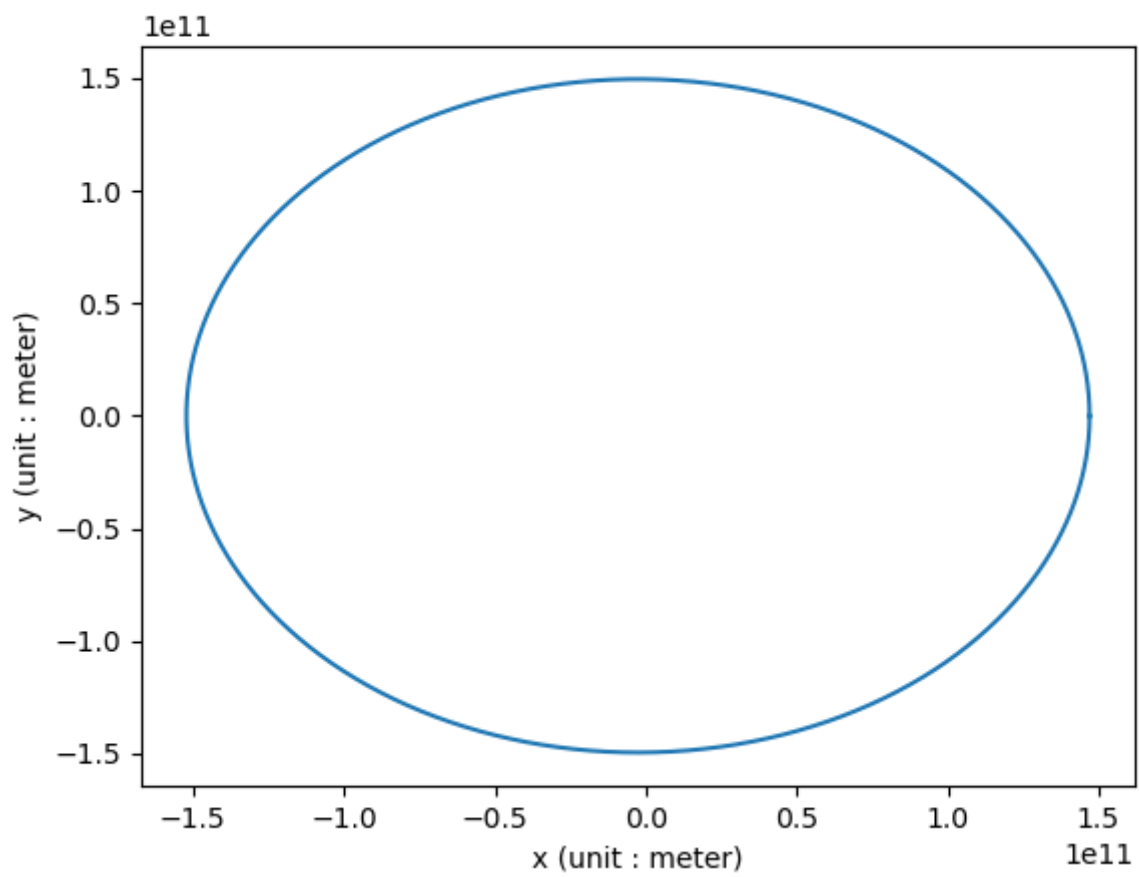
$$x_{n+1} = x_n + dt \times v$$

And since orbit is in two dimensional space, thus we have to calculate the x and y simultaneously.

## result

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In the end we get the orbit as figure shown :



We can see that the orbit form an ellipse.