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Initialize

```
clear; clc;
```

Define variables and constants

```
Re = 6378;          % km
global mu
mu = 398600;        % km^3/s^2
```

given initial conditions

```
h = 500;            % km
a0 = 300;           % deg
d0 = -20;           % deg
```

determine initial location and velocity

```
R0 = (6378 + h)*[cosd(d0)*cosd(a0) cosd(d0)*sind(a0) sind(d0)];     % km
V0 = [0 0 10];                                                      % km/s
t = 1800;                                                           % s
```

use algorithm from appendix again

```
[R, V] = rv_from_r0v0(R0, V0, t);
```

use algortihm 4.1

get these vars

```
r = norm(R);        % km
l = R(1)/r;
m = R(2)/r;
n = R(3)/r;

% calc and return del
d = asind(n);
fprintf("del: %g deg", d);
```

```
% check value of m
fprintf("\nm: %g", m);

% b/c m>0
a = acosd(l/cosd(d));
fprintf("\nalpha: %g deg", a);
```

```
del: 63.7473 deg
m: 0.38307
alpha: 120 deg
```

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