```
% note: this program must be run after the Ch_6_Lesson_11_Ex_1 program is run.
% this program continues the trajectory from that program starting at

i = 184000;

% so the x, y, xR, yR, arrays are already there, the constants initialized, etc.
% don't do a clear command !


xBoost = -3;      % x direction boost accel in m/sec/sec
yBoost = -9;      % y direction boost accel in m/sec/sec
tBoost = 0;       % boost timer
TBoost = 120;     % apply boost for TBoost seconds

i2 = i;           % remember where this program starts
dt = 1;
n=40000;     % 5000 for 1/3 orbit, 20000 for 1.5 orbits, 40000 for 2.5 orbits


for i=i+1:i+n


    t(i) = t(i-1) + dt;
    x(i) = x(i-1) + vx(i-1)*dt;  % project moon position to start of subinterval i
    y(i) = y(i-1) + vy(i-1)*dt;

    Rm = sqrt(x(i-1)^2+y(i-1)^2);  % calculate moon's accel due to earth gravity
    AgME = G*mEarth/Rm^2;           % interval i-1

    vx(i)= vx(i-1) - AgME*(x(i-1))/Rm*dt;  % project moon's velocity
    vy(i)= vy(i-1) - AgME*(y(i-1))/Rm*dt;


    xR(i) = xR(i-1) + vxR(i-1)*dt;  % project rocket's position to
    yR(i) = yR(i-1) + vyR(i-1)*dt;  % start of interval i

    Rr = sqrt(xR(i-1)^2+yR(i-1)^2);  % calculate rocket's accel due to
    AgRE = G*mEarth/Rr^2;             % earth gravity at start of interval i-1

    Rm = sqrt((xR(i-1)-x(i-1))^2+(yR(i-1)-y(i-1))^2); % calculate rocket accel
    AgRM = G*mMoon/Rm^2;          % due to moon at start of interval i-1

    % update rocket velocity due to accel due to earth and moon
    vxR(i)= vxR(i-1) - AgRE*xR(i-1)/Rr*dt - AgRM*(xR(i-1) - x(i-1))/Rm*dt;
    vyR(i)= vyR(i-1) - AgRE*yR(i-1)/Rr*dt - AgRM*(yR(i-1) - y(i-1))/Rm*dt;

   % apply boost

   if (tBoost <= TBoost)
      vxR(i) = vxR(i) + xBoost*dt;
      vyR(i) = vyR(i) + yBoost*dt;
      tBoost = tBoost + dt;
   end

   % check for collision
   if (Rm < rMoon)
      'collision'
       break
   end

end

II=[i2:i2+n];     % plot the trajectory just computed
```

```
plot(x(II),y(II))  % the moon's trajectory

hold on

plot(xR(II),yR(II)) % the rocket's trajectory

% here we draw a circle for the moon
for j=1:101
   ang=2*pi*j/100;
   xE(j)= rMoon*cos(ang);
   yE(j)= rMoon*sin(ang);
end
plot(xE + x(i),yE + y(i))                          % draw the moon centered at x(i),
y(i)

hold off

axis equal
```