1.
a. The ISS is in a 400x403 km orbit, inclined at 51.6 degrees.

b. 6 visible passes as of 2015/09/02. Pass with maximum elevation (67 degrees):
- Start: Az = SW, El = 12 degrees, Time 05:28 MDT
- End: Az = ENE, El = 10 deg, Time = 05:33 MDT

c. Next evening pass is 2015/10/01.
- Start: Az = SE, El = 10 degrees, Time 19:35 MDT
- End: Az = SE, El = 11 deg, Time = 19:36 MDT (just above the horizon for a little bit)

2.
a. As of 2015/09/02, the brightest Iridium flare in the next week will occur on 2015/09/07:
- 19:37:22 MDT
- Az: 353 degrees
- El: 48 degrees
- Iridium 53
- Magnitude of -7.7.

b. Iridium flares are when a satellite in the Iridium constellation reflects sunlight such that an observer on the ground sees a bright flash where the satellite is. These satellites have large, polished antennas that cause the high brightness. The attitudes of the satellites are tightly controlled, making the flares predictable.

3. Tried on the clear night of 2015/09/03. No successes, the brightest was supposed to be Tiangong-1 for 4 minutes with a magnitude of 0.9. Maximum elevation was 78 degrees. There are a lot of lights in my neighborhood so the light pollution was a factor.

4. Satellites are departing the solar system if they have reached heliocentric escape velocity, sqrt(2mu/r).

```
>> au2km = 149597871;
>> au_dist = [109.108 88.672 102.545 125.241 27.292];
>> mu_sun = 132712440018; %km3/s2, Wikipedia
>> V_esc = sqrt(2*mu_sun./(au_dist*au2km))
```

	Pioneer 10	Pioneer 11	Voyager 2	Voyager 1	New Horizons
V_esc_sun (km/s)	4.03	4.47	4.16	3.76	8.06
Is escaping?	Yes	Yes	Yes	Yes	Yes

5. For Boulder, CO on 2015/09/03 (times in MDT) (from timeanddate.com):
- Sunrise: 6:31
- Sunset: 19:29
- Moonrise: 22:57
- Moonset: 12:12
- 71.2% illuminated.