RINEX

```
     2.10           OBSERVATION DATA    G (GPS)             RINEX VERSION / TYPE
JPS2RIN 1.07        RUN BY              04-SEP-01 13:20     PGM /
RUN BY / DATE build October 30, 2000 (c) Topcon Positioning Systems
COMMENT RUN BY;COMMENT;MARKER NAME;MARKER NUMBER;OBSERVER;AGENCY;
COMMENT ANT #; ANT TYPE - You can set in profile.
COMMENT kai10001.jps
COMMENT Site
MARKER NAME
                                                            MARKER NUMBER
OBSERVER            AGENCY                                  OBSERVER
/ AGENCY MT301513219         JPS EUROCARD        2.2 Apr,25,2001 r
REC # / TYPE / VERS kai10001            -Unknown-
ANT # / TYPE
  3427819.3209   603664.0433  5326880.6438                  APPROX POSITION XYZ
        0.0000        0.0000        0.0000                  ANTENNA: DELTA H/E/N
     1     1                                                WAVELENGTH FACT L1/2
  2001     9     4     9    40    0.0000000     GPS         TIME OF FIRST OBS
  2001     9     4     9    40   22.0000000     GPS         TIME OF LAST OBS
     1.000                                                  INTERVAL
    13                                                      LEAP SECONDS
     7                                                      # OF SATELLITES
```

Solution to EASY1

```
     7    C1    P1    P2    L1    L2                      # / TYPES OF OBSERV
   G 1    23    23    23    23    23                        PRN / # OF OBS
   G 4    23    23    23    23    23                        PRN / # OF OBS
   G 7    23    23    23    23    23                        PRN / # OF OBS
   G13    23    23    23    23    23                        PRN / # OF OBS
   G20    23    23    23    23    23                        PRN / # OF OBS
   G24    23    23    23    23    23                        PRN / # OF OBS
   G25    23    23    23    23    23                        PRN / # OF OBS
                                                            END OF HEADER
 01  9  4  9 40  0.0000000  0  7G 1G 4G 7G13G20G24G25
  20532012.14648  20532011.55846  20532016.22546 107896448.4014   84075170.1284
  21255524.69947  21255524.94445  21255529.02045 111698540.8774   87037834.1244
  24648794.02245  24648792.88941  24648801.63741 129530300.6484  100932694.9344
  21267718.45748  21267718.52445  21267722.00945 111762613.2534   87087766.9504
  21900010.88847  21900009.74444  21900015.95344 115085325.1934   89676892.5064
  23828505.41246  23828504.07842  23828511.81542 125219643.5474   97573763.5014
  24104647.59546  24104646.97742  24104654.81342 126670763.8784   98704504.1444

 01  9  4  9 40  1.0000000  0  7G 1G 4G 7G13G20G24G25
...
```

Solution to EASY1

julday.m

```
function jd = julday(y,m,d,h)
% JULDAY  Conversion of date as given by
%         y ... year (four digits)
%         m ... month
%         d ... day
%         h ... hour and fraction hereof
%         The conversion is only valid in the time span
%         from March, 1, 1900 to February, 28, 2100

%  For further information see
%  Meeus, Jean (1991) Astronomical Algorithms,
%         Willmann-Bell, Richmond, Virginia, p. 59--62

%  Written by Kai Borre
%  February 14,2001

      if m <= 2, y = y-1; m = m+12; end
      jd = floor(365.25*(y+4716))+floor(30.6001*(m+1))+d+h/24-1537.5;
%      mjd = jd-2400000.5;
```

gps_time.m

```
function [week,sec_of_week] = gps_time(julday)
% GPS_TIME   Conversion of Julian Day number to GPS week and
%          Seconds of Week reckoned from Saturday midnight

% Written by Kai Borre
% May 20, 1996

    a = floor(julday+.5);
    b = a+1537;
    c = floor((b-122.1)/365.25);
    e = floor(365.25*c);
    f = floor((b-e)/30.6001);
    d = b-e-floor(30.6001*f)+rem(julday+.5,1);
    day_of_week = rem(floor(julday+.5),7);
    week = floor((julday-2444244.5)/7);
    % We add +1 as the GPS week starts at Saturday midnight
    sec_of_week = (rem(d,1)+day_of_week+1)*86400;
```

easy1.m

```
%EASY1   Computation of the essential parameter:
%         seconds of week, sow

%Kai Borre 27-07-2002
%Copyright (c) by Kai Borre
%$Revision: 1.0 $  $Date: 2002/07/27  $

%Copy of line 29 in the RINEX file site247j.01o
%01  9  4  9 40  0.0000000  0  7G 1G 4G 7G13G20G24G25
% Compute sow for first epoch in observation file
jd = julday(2001,9,4,9+40/60);
[week,sow] = gps_time(jd)
```

Solution to EASY1

Exercises

```
>> %exercise 1
>> julday(2000,1,1,12)
ans =
    2451545.00
>> %exercise 2
>> now = julday(2009,4,4,10)
now =
    2454925.92
>> %exercise 3
>> [week,sow] = gps_time(now)
week =
       1525.00
sow =
     554400.00
```

Solution to EASY1

doy.m

```
function  [day_of_year,hr,min,sec] = doy(year,month,day,hour)
%DOY   Calculation of day number of year.
%   hour is split into hr, min, and sec

%Kai Borre 10-07-96
%Copyright (c) by Kai Borre
%$Revision: 1.0 $  $Date: 1997/09/26  $

day_of_year = julday(year,month,day,0)-julday(year,1,1,0)+1;
hr = floor(hour);
min = floor((hour-hr)*60);
sec = ((hour-hr)-min/60)*3600;
```