Exercise 3a Lab Activity   Name: _____

Earth-Sun Relationships   Lab Section: _____

Please show your work. If necessary, please use additional paper to show work.

✎ 1a) Consider building a house in Massachusetts. In order to gain maximum sunlight in your living room, which direction should the window face? _____SOUTH_____

Why? We are north of the Tropic of Cancer (23.5°N) Therefore, the sun will never be directly overhead, it will always be towards our south. Rises in SE, follows to the south and sets in SW

b. If you were building a house in Santiago Chile and wanted maximum sunlight in the living room, what direction should your window face? _____NORTH_____

Why? They are south of the Tropic of Capricorn (23.5°S) Therefore, the sun will never be directly overhead, it will always be towards their north. Rises in NE, follows to the north and sets in NW

✎ 2) When (what date) is the Sun directly overhead of:

a.   The Tropic of Capricorn   Winter solstice, Dec. 22

b.   The Tropic of Cancer   Summer solstice, June 21

c.   The Equator   Spring and Fall Equinoxes (Mar. 21 & Sept. 23)

d.   The Arctic Circle   NEVER! It is never farther north than the Tropic of Cancer (23.5°N)

✎ 3) Give the latitude and the significance of (what is important concerning):

a.   The Tropic of Capricorn: (23.5°S) The southernmost point for the 90° sun rays, on the winter solstice

b.   The Tropic of Cancer: (23.5°N) The northernmost point for the 90° sun rays, on the summer solstice

c.   The Arctic Circle: (66.5°N) The farthest south of the North pole that receives 24 hours of sun/dark on the solstice

d.   The Antarctic Circle   (66.5°S) The farthest north of the South pole that receives 24 hours of sun/dark on the solstice

The Arctic & Antarctic Circles

The Arctic Circle (66 ½ ° N) and Antarctic Circle (66 ½ ° S), mark the limit of the possibility of 24 hours of darkness or light. For other latitudes we can roughly establish the length of day by first determining the proportion of the parallel that is in the light zone. The same proportion of 24 hours would be daylight.

✎ 4) Notice the relative length of daylight in the northern and southern hemispheres on June 21 in Figure P3.3. On June 21 what might the daylight situation be at:

a.   The Arctic Circle: 24 hours of sunlight

b.   The Equator: 12 hours of sunlight

c.   Antarctic Circle: 0 hours of sunlight

✎5) Six months later on December 22 what might the daylight situation be at:

a.   The Arctic Circle: 0 hours of sunlight

b.   The Equator: 12 hours of sunlight

c.   Antarctic Circle: 24 hours of sunlight

✎6) Usually we think of the seasons of the year as they occur in the Northern Hemisphere. Determine when the following seasonal positions occur in the **Southern Hemisphere**. List the dates.

a.   Vernal Equinox   Sept. 23

b.   Autumnal Equinox   Mar. 21

c.   Winter Solstice   June 21

d.   Summer Solstice   Dec. 22