BRIAN'S COPY

Lab 1 Exercise
The Geographic Grid

Name: _____
Lab Section: _____

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

Latitude and Longitude

1. What name is given to the zero line of latitude? The Equator

2. What is the zero reference line of longitude called? The Prime Meridian

3. Explain why labels (North or South, East or West) are needed when giving geographic coordinates. We need to determine N or S of Equator, or E/W of Prime Meridian as the degree alone is not enough to differentiate

4. Which lines measure distance north and south? Latitude

5. Which lines measure distance east and west? Longitude

6. For each of the following sets of geographic coordinates, indicate which are correct and which are incorrect. For those that are incorrect, circle the error and explain why it is not correct.

		Correct	Incorrect	Why incorrect
a.	13°N, 85°E			
b.	68°S, 190°W		✓	Long. is over 180°
c.	38°E, 42°S		✓	Long is not first
d.	52°N, 12°W			
e.	25°W, 65°E		✓	Both Longitudes
f.	58°28'S, 79°65'E		✓	Long minutes is over 60

g. 77°54"N, 112°33"E × TECHNICALLY this is wrong because you have no value for minutes, only seconds

7. Using a globe or atlas, determine the geographic coordinates to the nearest degree for the following places.

a. Chicago, IL 42N, 88W
b. Santiago, Chile 33 S, 70W
c. Istanbul, Turkey 41°N, 30 E
d. Sydney, Australia 35°S, 150 E

8. Each location below holds a global weather record. Using the coordinates given, determine what city/place is in each location, including the name of the country where applicable.

Record		Coordinates	City/Place
Highest temperature (1913)	134°F	36°27'N, 116°51'W	DEATH VALLEY, CA / LAS Vegas, NV
Lowest temperature (1983)	-128.5°F	77°32'S, 106°40'E	Antarctic (VOSTOK)
Highest annual precipitation	467 in.	25° 18′ N, 91° 35′ E	Bangladesh
Greatest 1-hr rainfall (1947)	12 in.	39°27'N, 94°20'W	Kansas City, Missouri
Highest dewpoint (2003)	95°F	26°16'N, 50°09'E	Dammam, Saudi Arabia / Bahrain
Longest dry period (1903-18)	173 mo.	18°29'S, 70°18'W	La Paz, Bolivia
Highest wind speed (1996)	253 mph	20°49'S, 115°23'E	off west coast of Australia
Lowest pressure (1979)	870 mb	16°44'N, 137°46'E	1000 miles East of the Philippines

Measuring Distance with the Geographic Grid

Using Figures 1.5a and 1.5b determine the distances.

9. (Figure 1.5a)

A – B = 30 degrees

B + C = 60 degrees

1° latitude = 69 statute miles

(A - B)° * 69 = 2070 miles

(B + C)° * 69 = 4140 miles

1° latitude = 111 km.

(A - B)° * 111 = 3330 km

(B + C)° * 111 = 6660 km

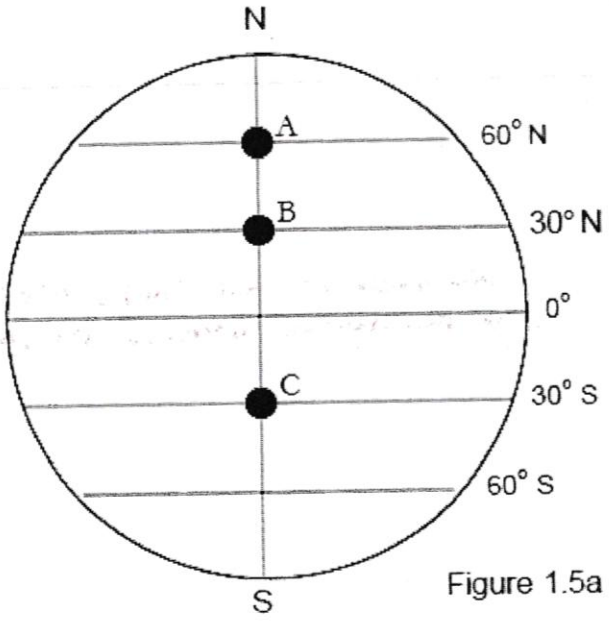

Figure 1.5a

10. (Figure 1.5b)

D – E = 15 degrees

D + F = 60 degrees

1° longitude = 69 statute miles at 0°

(D – E)° * 69 = 1035 miles

(D + F)° * 69 = 4140 miles

1° longitude = 111 km at 0°

(D – E)° * 111 = 1665 km

(D + F)° * 111 = 6660 km

G – H = 15 degrees

G + I = 60 degrees

1° longitude = 60 statute miles at 30°

(G – H)° * 60 = 900 miles

(G + I)° * 60 = 3600 miles

1° longitude = 96 km at 30°

(G – H)° * 96 = 1440 km

(G + I)° * 96 = 5760 km

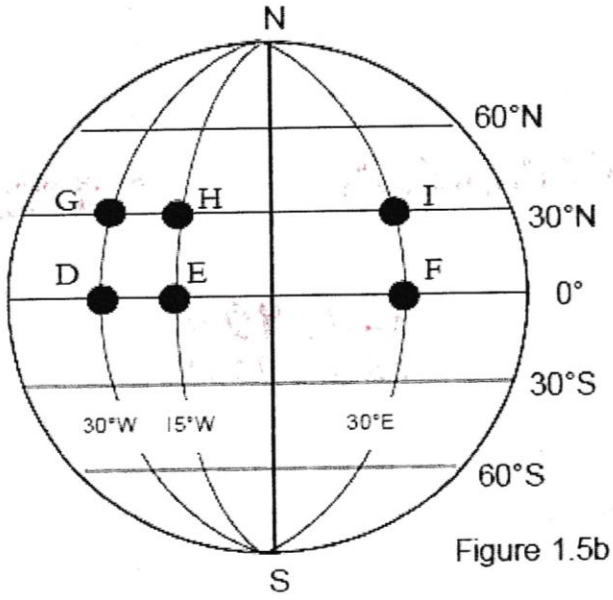

Figure 1.5b

REPLACES LAB PAGES 9 & 10

11) How many degrees of longitude are there (shortest distance) between:

a. 90°E and 170°E — 80°

b. 75°W and 105°W — 30°

c. 75°W and 30°E — 105°

d. 105°W and 105°E — 150°

210 but >180 → 360−210 = 150°

(special case involving International Date Line)

12) Find the shortest distance in statute miles and kilometers: → @ 0° 1° = 69 m, 1° = 111 km

a. Between the Galapagos Islands (0°, 90° W) and the Howland islands (where Amelia Earhart disappeared (0°, 177° W).

177 W − 90 W = 87°

87° × 69

87° × 111

Statute Miles: 6003 miles

Kilometers: 9657 km

b. Between Seward, Alaska (60° N, 150° W) and Oslo, Norway (60° N, 12° E) → @ 60 1° = 35 m, 1° = 56 km

150 W + 12 E = 162°

162 × 35

162 × 56

Statute Miles: 5670 miles

Kilometers: 9072 km

c. Between Camden, NJ (40° N, 75° W) and Beijing, China (40° N, 118° E) → @ 40° 1° = 53 m, 1° = 85 k

(special case involving International Date Line)

118 E + 75 W = 193

but > 180

so.. 360 − 193 = 167°

167 × 53

167 × 85

Statute Miles: 8851 miles

Kilometers: 14195 km

d. Distance in Latitude: Between Albuquerque, NM (35° N) and Boulder, CO (40° N)

40 N − 35 N = 5°

5 × 69

5 × 111

Statute Miles: 345 miles

Kilometers: 555 km

Decimalization of Latitude and Longitude

The National Weather Service (NWS) uses the decimal system with degrees and tenths of degrees not degrees, minutes and seconds. For example, 42° 30' N is equal to 42.5° N. To decimalize a latitude and longitude all you need to do is to divide the minutes reading by 60 (i.e. 30'/60 = 0.5°, 45'/60 = 0.75°).

13) Decimalize the following latitude and longitude readings:

a. 25° 30' N — 25.5° N

b. 110° 15' E — 110.25° E

c. 10° 45' S — 10.75° S

d. 88° 5' N — 88.08° N

e. 5° 55' N — 5.92° N

f. 57° 47' 22" S — 57.789° S

22/60 = .366

47.366/60 = .789

BRIAN'S COPY