LAB 2. WORKED EXAMPLES

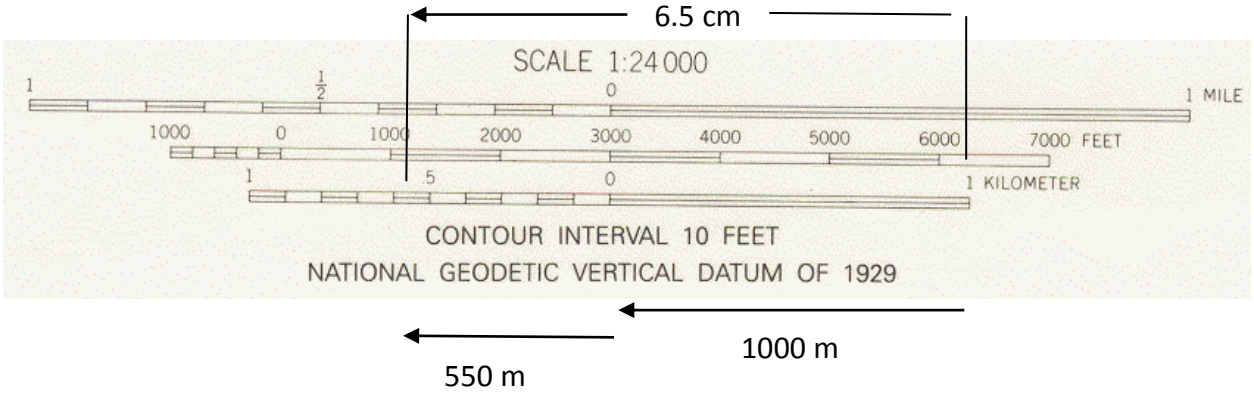
Note: I've revised this and decided to use Lab 2, questions 1&5 as examples.

1. Find the length in meters of a minute of longitude on the map.

97° 2' 30" W (the 97° has been left off to reduce clutter)

97° 00' W

The difference in longitude between these two points is 2′ 30" or 2.5′. Using a ruler measure the distance between these two points - it is 16.2 cm. We need the length of one minute, so we divide this by 2.5: 16.2/2.5 = 6.5 cm. Use the graphic scale to determine the distance on the map (in meters) represented by 6.5 cm:



It is <u>1550 m (rounded to nearest 50 m).</u>

2. At 60^0 N, one degree of longitude equals 55.8 km; one degree of latitude equals 111 km. Using these equivalents, calculate the distance in km between the following locations:

60^0 00' 00" N to 60^0 00' 00" N
133^0 22' 45" W 136^0 30' 50" W

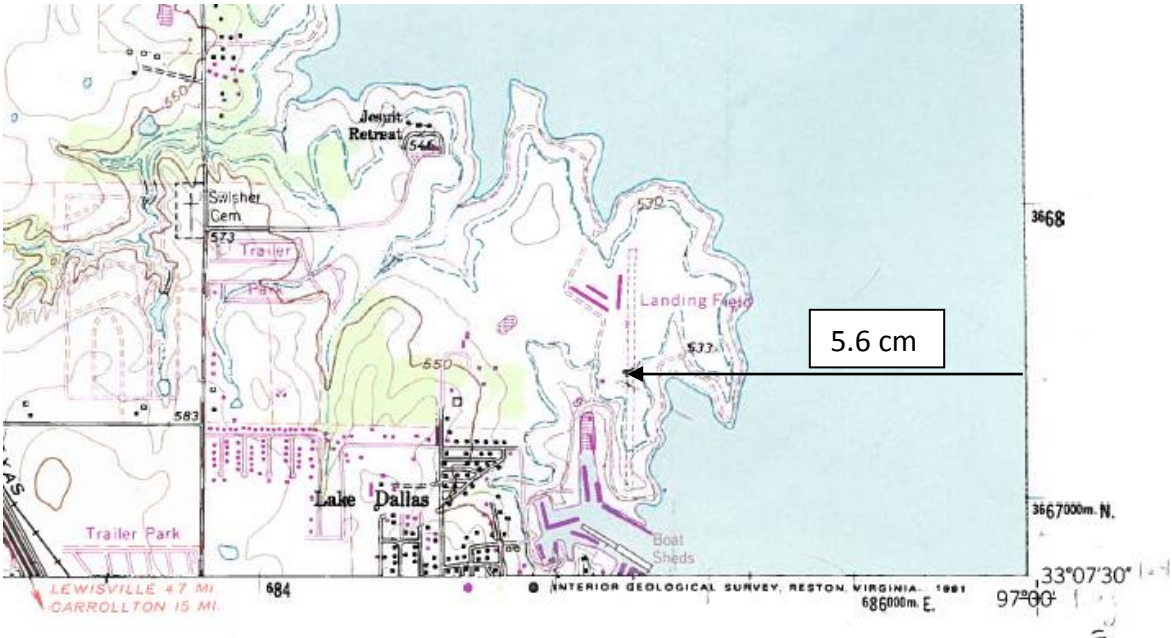
LONGITUDE is changing. The amount of change is 3^0 8' 5". 1^0 = 55.8 km, therefore 3^0 8' 5" =
3 x 55.8
+ 8 x 55.8/60
+ 5 x 55.8/3600

= 167.4 + 7.44 + 0.0775 = 174.9175 km = <u>174.918 km</u> (round to 3 decimal places).

3. What would be the distance in miles of the following distance where one longitude degree equals 45.2 miles:
4^0 20' 35" ? Answer = 4 x 45.2
+ 20 x 45.2/60

+ 35 x 45.2/3600
= 180.8 + 15.06666666667 + 0.4394444444444 = 196.3061111111 miles = <u>196.306 miles.</u>

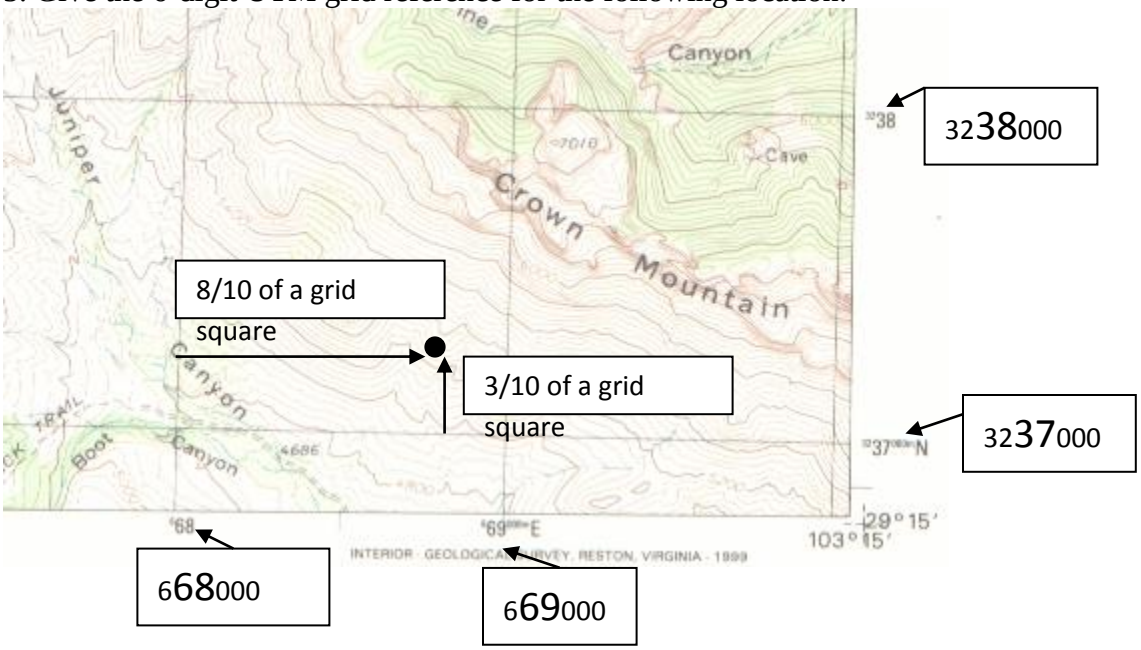
4. Give precise longitude coordinates of the center of the landing field at Lake Dallas:



From Q. 1 above, we know that 1' **longitude** = 6.5 cm. Therefore the longitude will be 97º 00' + 5.6/6.5 x 1' or 97º 00' + 5.6/6.5 x 60"

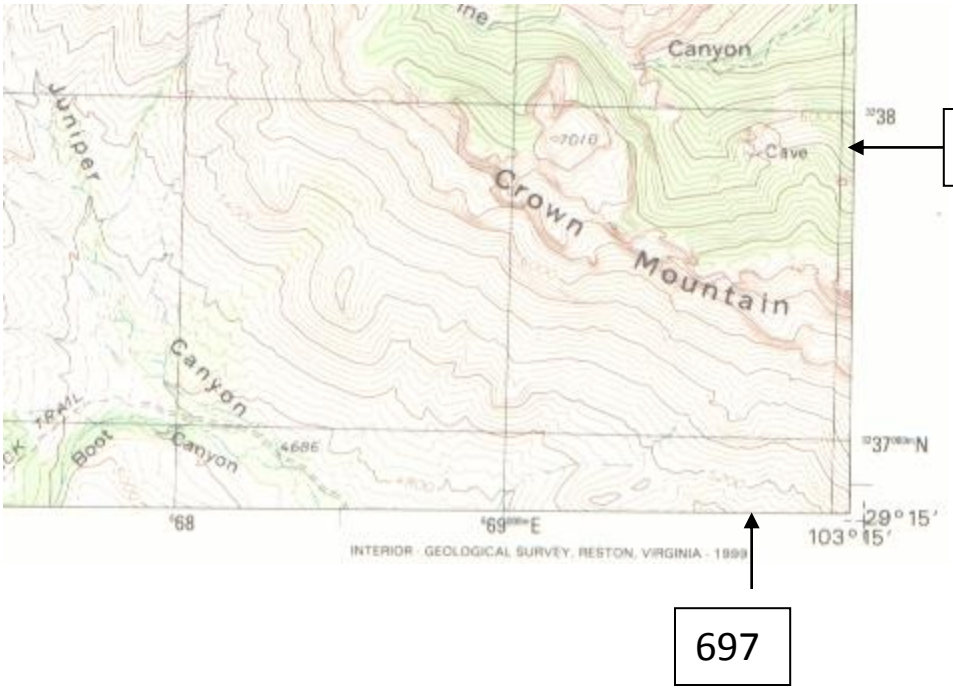
= 97º 00' + 52" = <u>97º 00' 52" W</u> (Round to nearest second).

5. Give the 6-digit UTM grid reference for the following location:



The actual UTM reference for the point is 668800 m east, 3237300 m north. By convention, for a 6-digit UTM reference this is written as <u>688373</u> (note that the easting is always given first).

6. What is found at the following UTM grid reference: 697379



The answer is a <u>cave.</u>

7. How many kilometers a) east and b) north are between UTM references 123456 and 333777?

We know that two zeros have been left off of these 6-digit UTM references; we must return the two zeros to calculate the distances:

a) easting separation = 33300 -12300 m = 21000 m = <u>21 km.</u>

b) northing separation = 77700 - 45600 m = 32100 m = <u>32.1 km.</u>