

How the earth is broken up into pieces

# COORDINATE SYSTEMS AND UTM



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# Map Datum

Map datum is a model of the shape of the earth for computing positions. Two common datum are:

- WGS84
- NAD27

Know your datum!

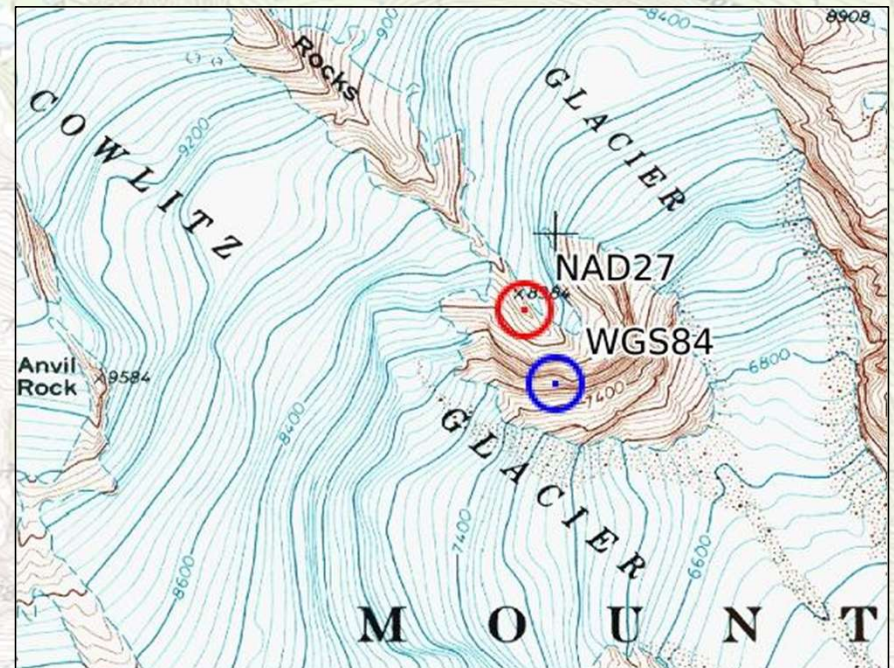
North American Datum of 1927 (**NAD 27**). Projection and 10000-foot ticks: Washington Coordinate System, south zone (Lambert Conformal Conic)  
Blue 1000-meter Universal Transverse Mercator ticks, zone 10





# Datum Shift

The map shows the same coord\* plotted in the two datums; the points are about 215m apart



\*10T

05<sup>98</sup>428E

51<sup>87</sup>029N



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# Coordinate System

A way to identify and name any point on the earth.

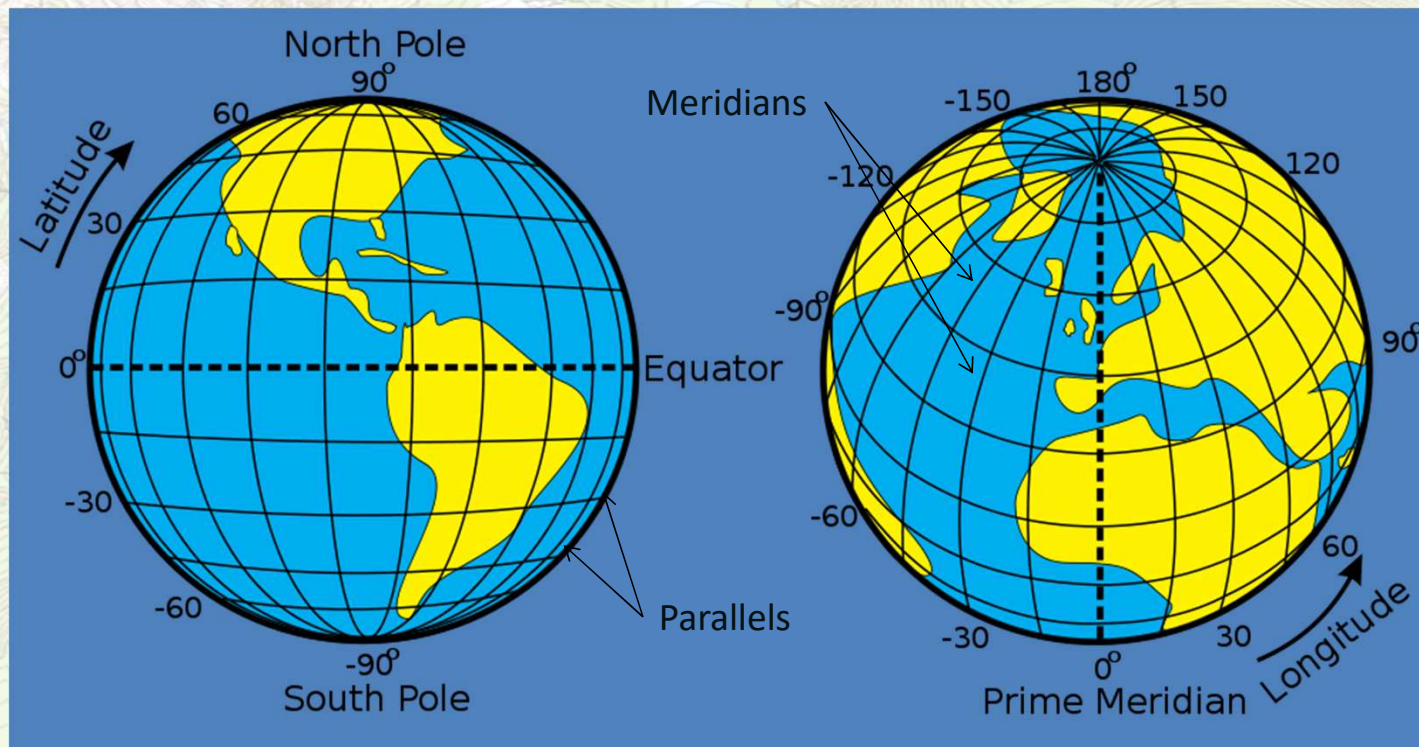
There are several systems, but we care about two:

- Latitude and Longitude
- Universal Transverse Mercator or UTM





# Latitude / Longitude





# Latitude / Longitude

Expressed in:

- Degrees °
- Minutes ' (60 minutes in a degree)
- Seconds " (60 seconds in a minute)

Also sometimes shown as decimal degrees

$$46^{\circ}45' = 46.75^{\circ}$$



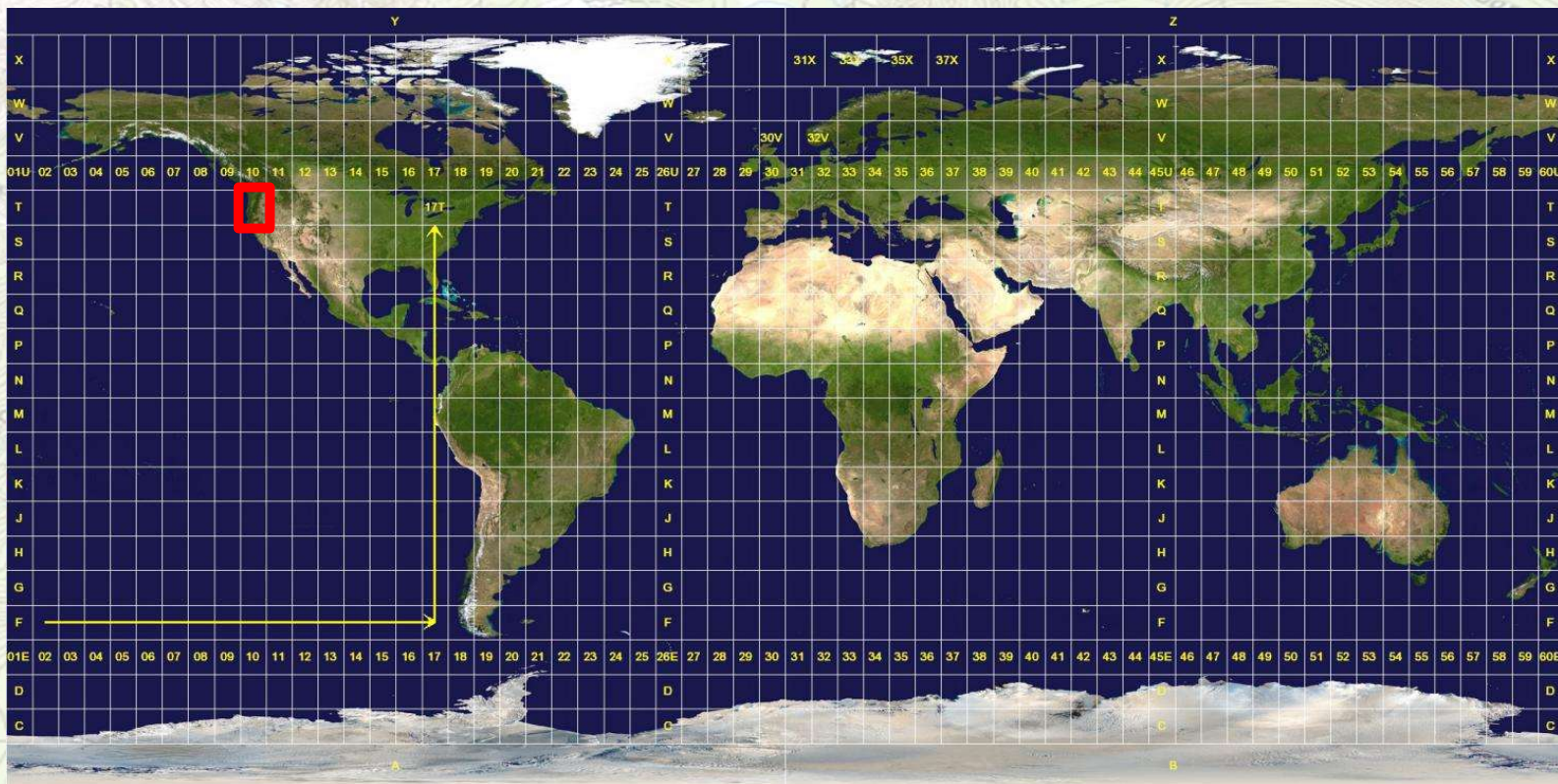
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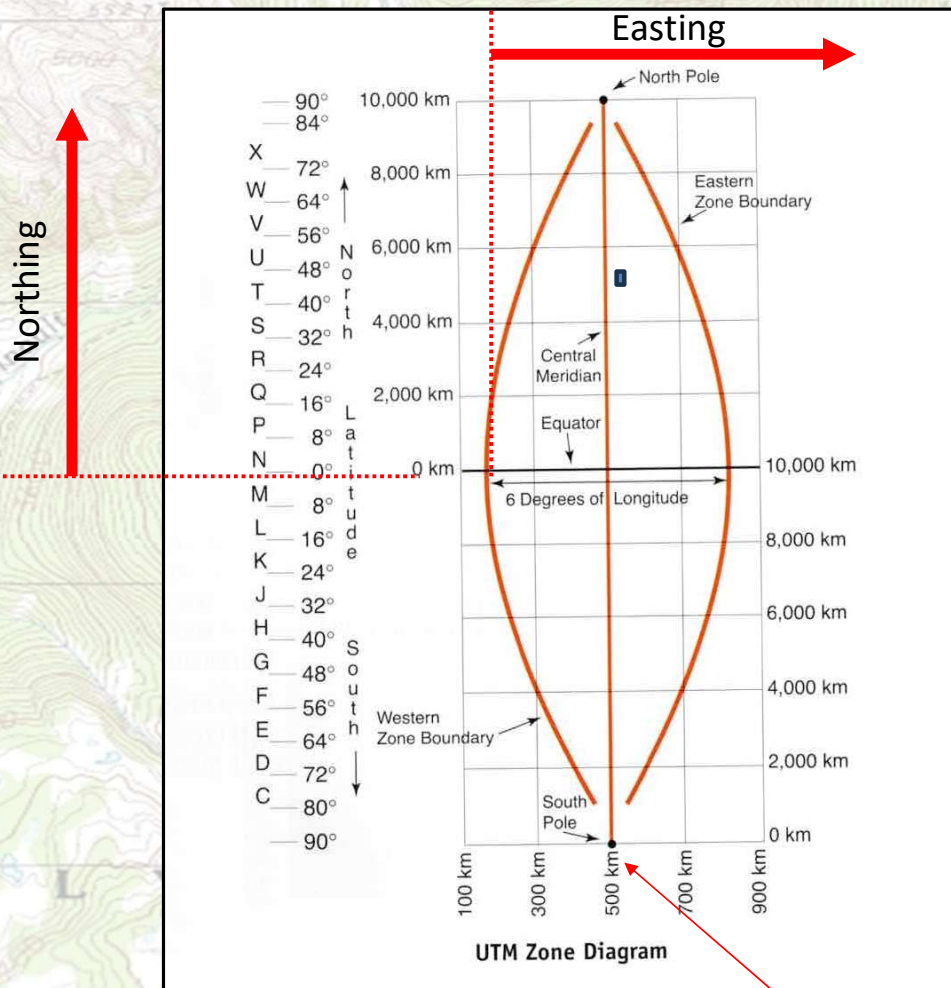


# Universal Transverse Mercator (UTM)





# Definition of UTM Zone



The UTM zones are defined  
Such that the northing increases  
North and the easting increases  
East.

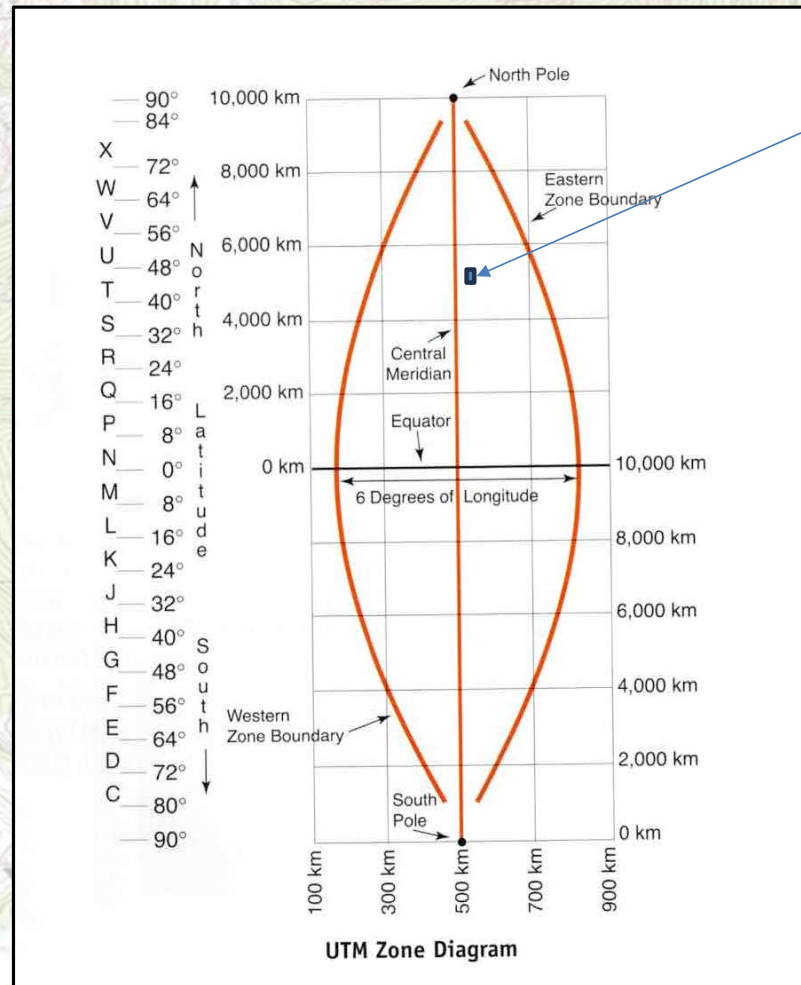
This is the same as a typical “graph”

Ref: Carnes, J. (2007) UTM, 3<sup>rd</sup> Ed.,  
MapTools, La Honda, CA, 50 pages.





# Definition of UTM Zone



This is Washington

Washington's Zone = 10T

Our Central Meridian is 123°W

So Oly is just east of it.

Ref: Carnes, J. (2007) UTM, 3<sup>rd</sup> Ed., MapTools, La Honda, CA, 50 pages.



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# Universal Transverse Mercator (UTM)

How is a UTM Coordinate Written:

- Zone (a rectangle, e.g. 10T contains Olympia)
- Easting (meters, increases toward the east or right)
- Northing (meters, increase toward the north or up)



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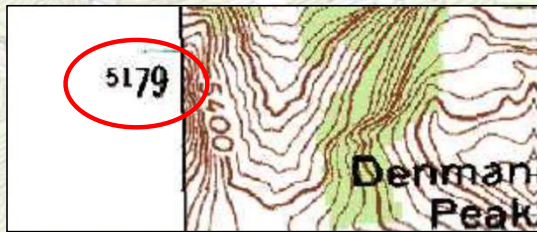
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# Universal Transverse Mercator (UTM)

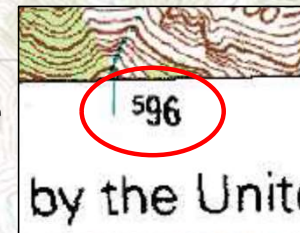
Find UTM on your map:

West  
edge



$5179 = 51^{79}000$  northing

South  
edge



$596 = 05^{96}000$  easting



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# UTM Coordinates for Inspiration Point

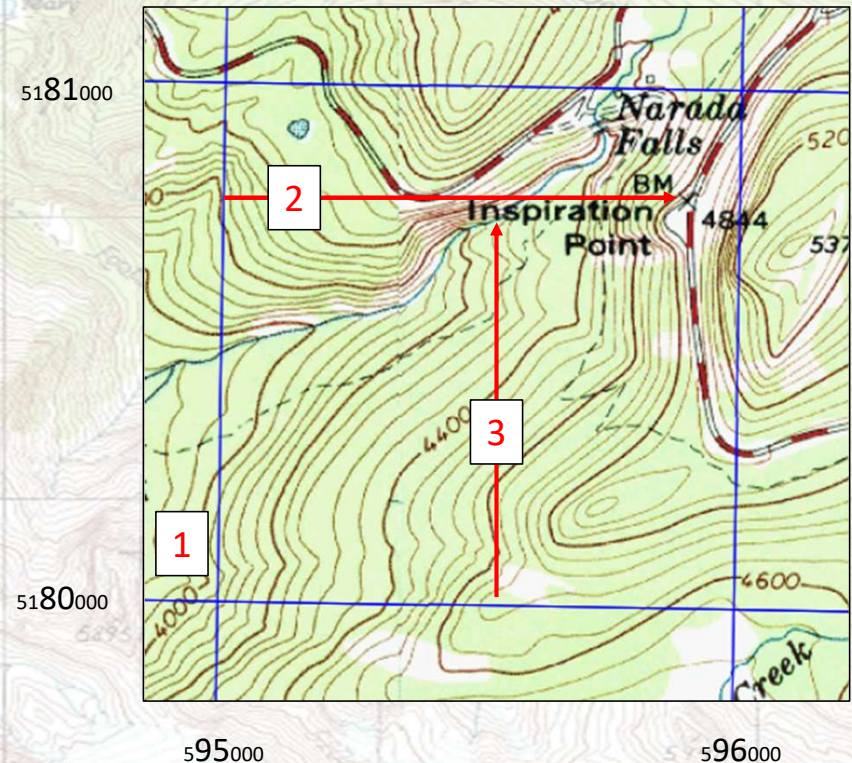
1. Work from the grid corner (circled) below and to the left, or southwest, of Inspiration Point.
2. Estimate distance east from 05<sup>95</sup>000, say about 900 m.

So, Easting is 05<sup>95</sup>900E

3. Estimate distance north from 51<sup>80</sup>000, say about 800m?

So, Northing is 51<sup>80</sup>800N

⇒ 10T 05<sup>95</sup>900E 51<sup>80</sup>800N.





# UTM Coordinates for Inspiration Point

Measure the coordinate using a UTM grid reader

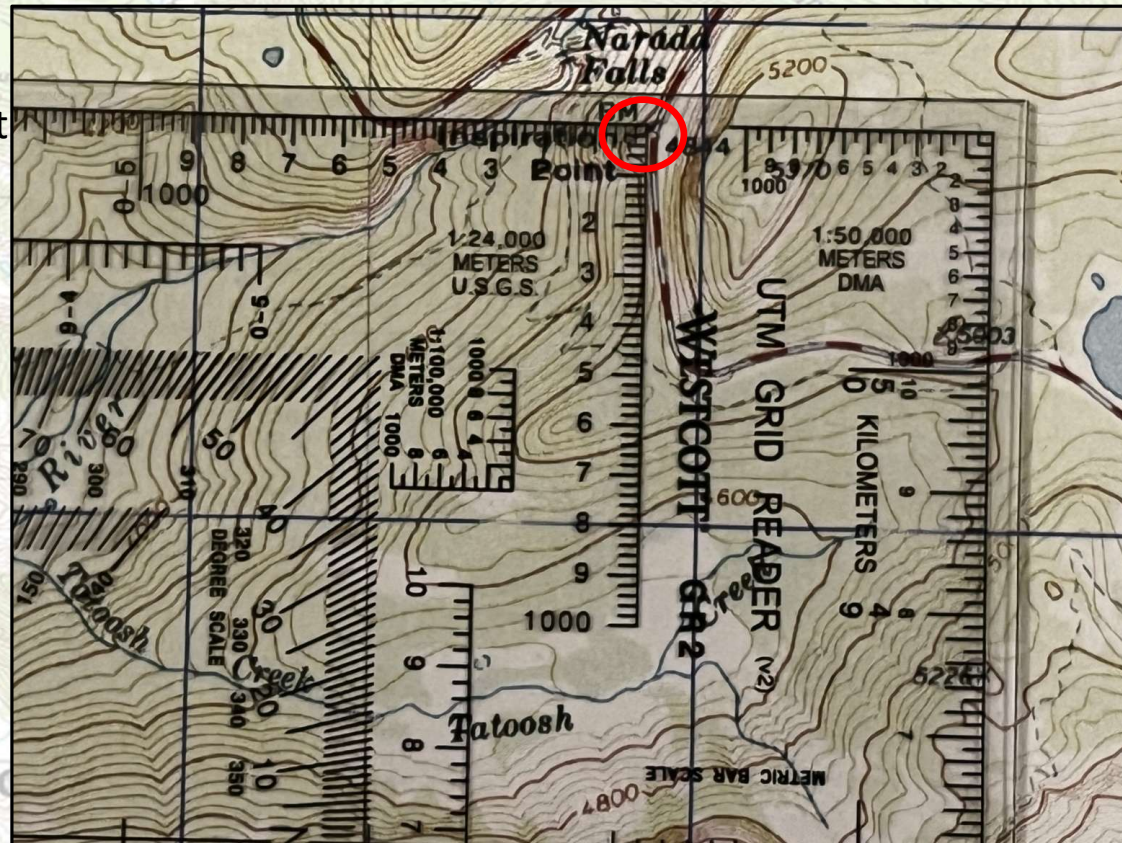
1. Use the grid with the same scale as the map.
2. Place corner of grid over the point of interest (red circle).
3. Check that the scale lines are about perpendicular to the UTM lines on the map.
4. Read the easting and northing distances indicated by the scale.

The easting dist = 890 m

The northing dist = 800N

⇒ 10T 05<sup>95</sup>890E  
51<sup>80</sup>800N.

Compares well with our  
estimated coordinates.



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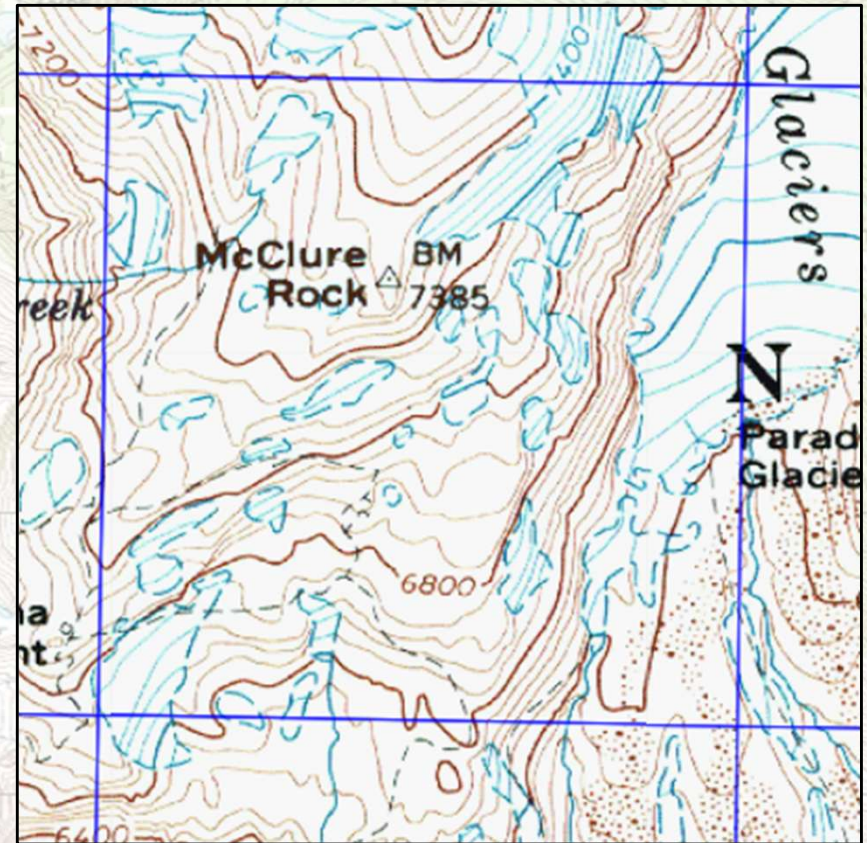
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# Your Turn

What is the UTM for McClure Rock?

1. Start from the SW corner
2. Estimate easting
3. Estimate northing



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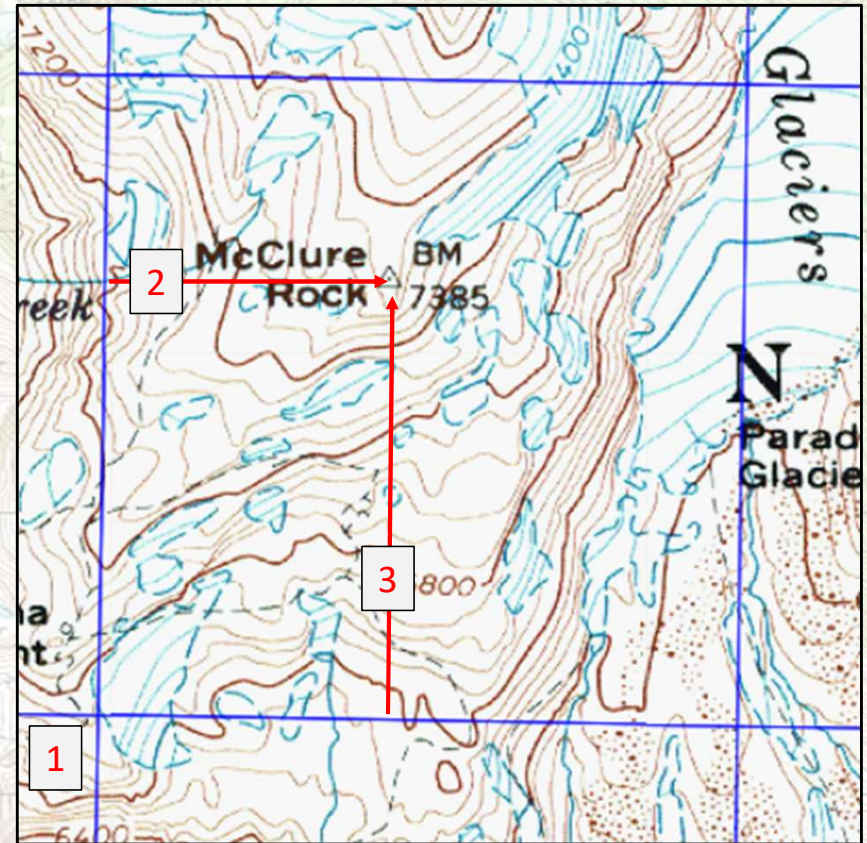


# Your Turn

What is the UTM for McClure Rock?

1. Start from the grid corner SW of McClure Rock
2. Estimate easting
3. Estimate northing

⇒ 10T 05<sup>97</sup>440E  
51<sup>84</sup>690N



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# Given Coordinates – Plot/Find the Point on the Map

1. Zone: 10T
2. Easting: 05<sup>96</sup>500E
3. Northing: 51<sup>83</sup>860N

??



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# Plotting Coords...

1. Use the first 4 digits of the coordinates to find the correct “square” that will contain the point:

Easting: 05<sup>96</sup>

and Northing: 51<sup>83</sup>

2. Measure from the intersection of these UTM lines (circled)

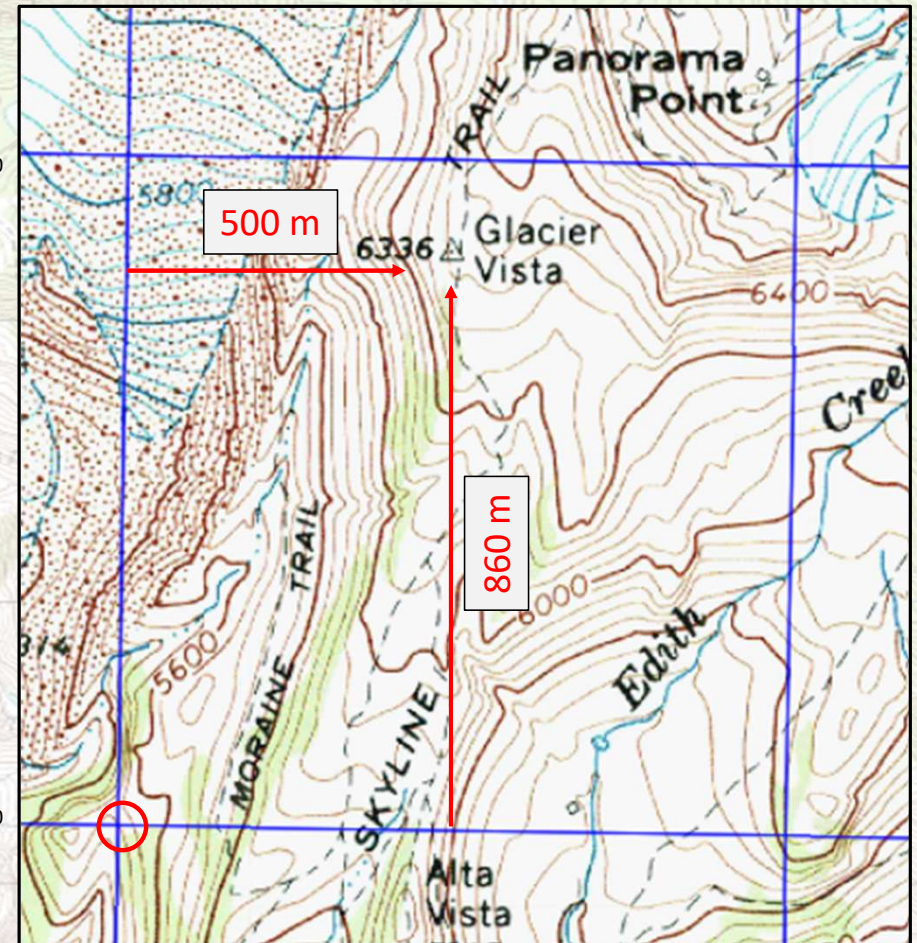
⇒ Glacier Vista



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0596000

0597000

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Questions?



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