Map & Compass 101

- ## Parts & Pieces

Left compass labels:
- baseplate
- scales
- direction-of-travel arrow
- magnifier
- index pointer
- dial
- declination marks
- orienting arrow
- orienting lines
- needle
- housing
- READ BEARING HERE
- 1 INCH
- SCALE 1:62500
- SCALE 1:24000

Right compass labels:
- sighting and signal mirror
- magnetic needle
- orienting lines
- magnifying lens
- clear base plate
- direction-of-travel arrow
- scales
- orienting arrow
- azimuth ring

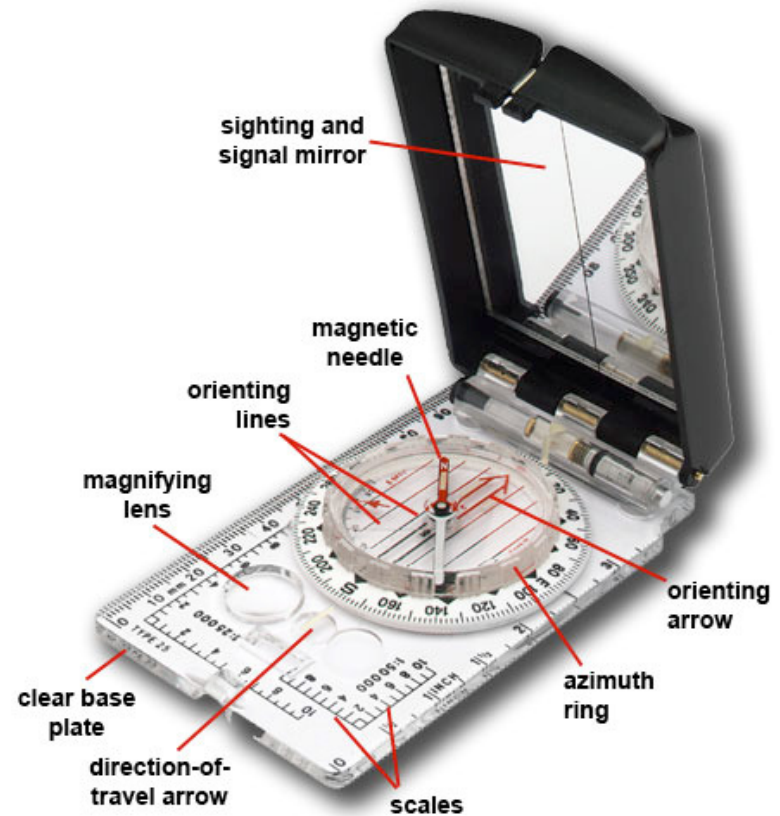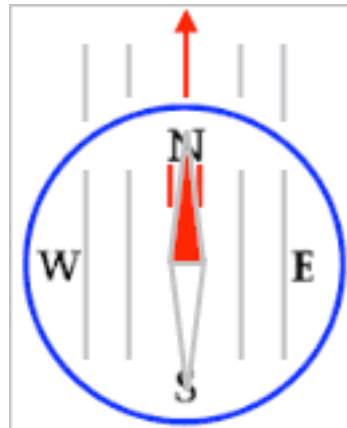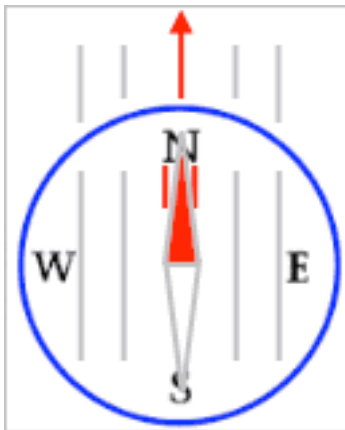# Map & Compass 101
Reading a Compass

- **Needle** <u>ALWAYS</u> points North
  - *If you're north of the equator, face the sun at lunchtime; whichever end of your compass needle points to the sun is South & the end that points to you is North*
- Hold steady & level
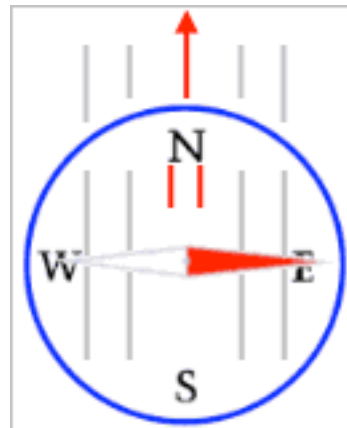- Direction of Travel arrow points straight away from you

Map & Compass 101
Reading a Compass

- **Try This:**
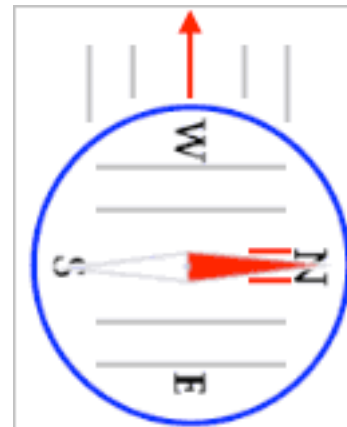
- **Stand so your compass looks like this:**

Which way are you pointing?

Now Turn your body so your compass looks like this:
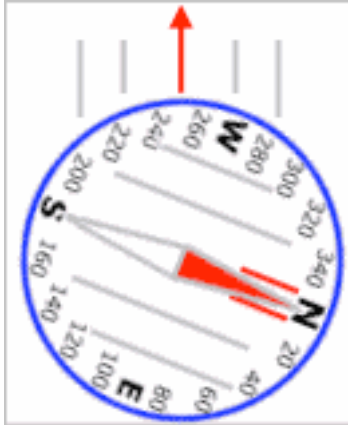
Which way is the Compass pointing? …East?

Nope! Gotta put "*red in the shed*"

We're really heading (pointing) West

Map & Compass 101
Finding Your Way

- **Taking a bearing**
  - The direction you're going is your HEADING
  - A BEARING is a HEADING you want to follow to go to a certain place
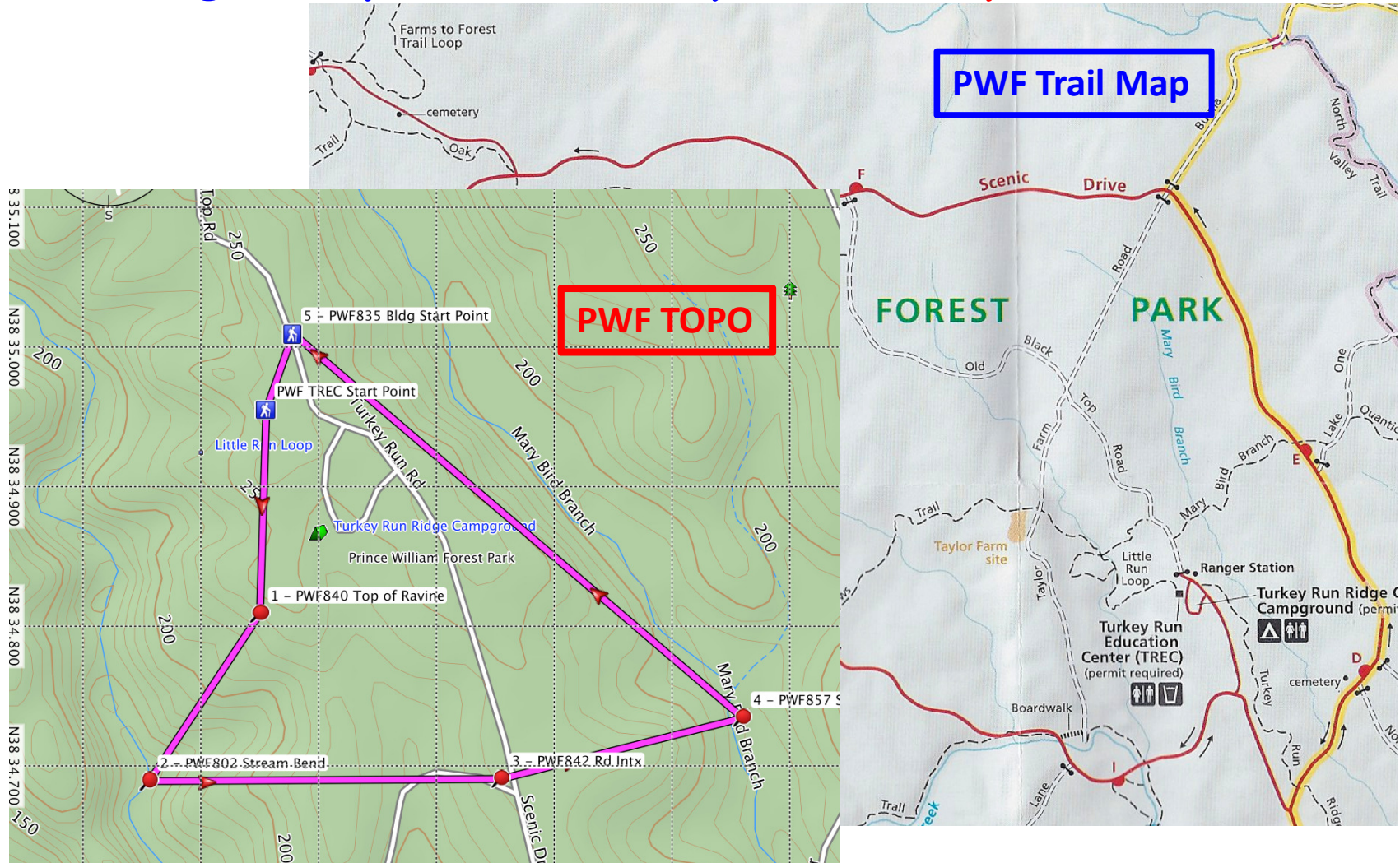 - Heading and Bearing are pretty much the same thing; here's a heading/bearing of about 250 degrees:

Try a few bearings:

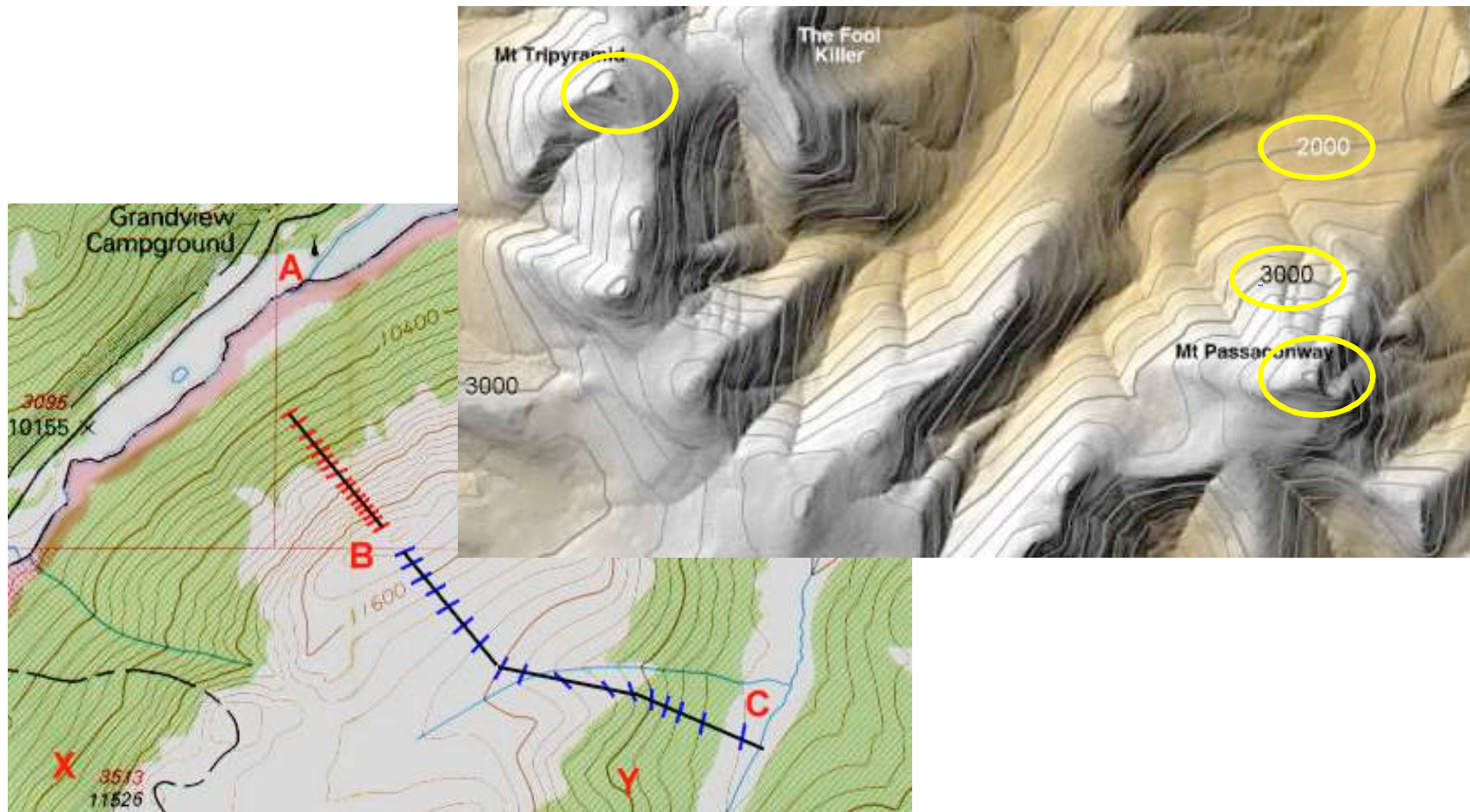040°, 120°, 245°, 330°

Map & Compass 101
Finding your Way – Map Basics

- Reading a Map – Scales & Symbols – <u>Topo Charts</u>!!
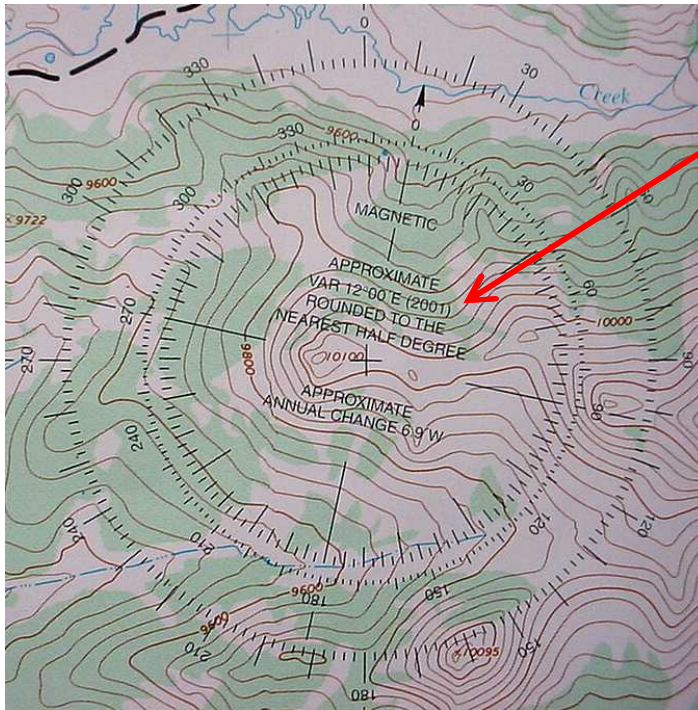
Map & Compass 101
Finding your Way – Map Basics

- **Topo Charts – some more details**

Map & Compass 101 – Using your Map

- ## Declination – or "*Mag North ain't True*"
  - ➢ Maps and Charts are printed with TRUE NORTH UP
  - ➢ But a Compass works in MAGNETIC – so we have to correct for Declination
  - ➢ "East is Least, West is Best" – *Learn it, Live it, Love it!!*
    - *Set it and forget it ... or...Mental Math: Add West, Subtract East*

Declination 12° East

Try this:
Say you measure a course on your **map** of 020° from Point A to Point B

If the **Declination** is 5° East, what Magnetic bearing or heading do you need to take to get from A to B?

What if **Declination** is 5° West?

Map & Compass 101 – Setting & Reading Headings

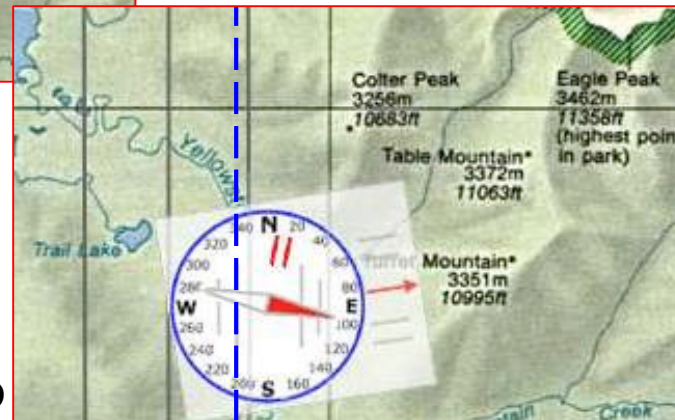- ## Step by Step 1 – 2 - 3

1 – set your map on the ground;
find where U are
and where U want to go

2 – set your **compass edge**
along a straight line from
where U are to where U
want to go

3 – turn the compass dial until
The Orienteering lines are
Parallel to the North / South
Meridian lines on the map.
Now you've taken a bearing!
The direction you need to go to
Get to the mountain is about 85°

That's all there is to it!!
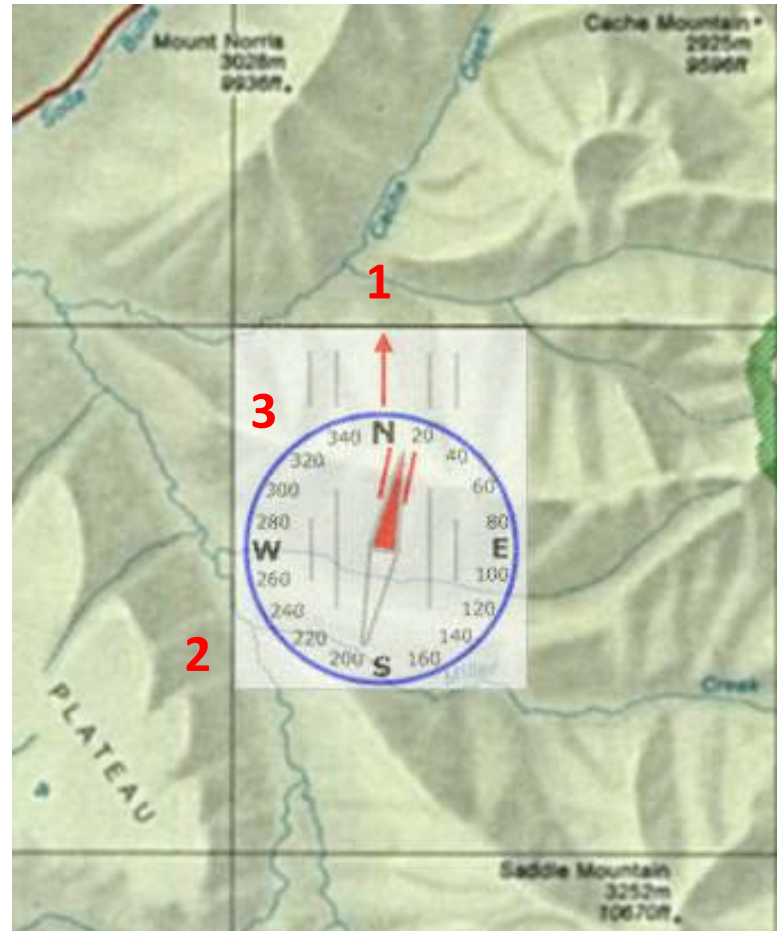
Map & Compass 101 – Orienting Your Map

- ## Step by Step 1 – 2 - 3

1 – set your map on the ground; turn your *declination adjusted* compass dial so due
North is at the index pointer

2 – place your compass
on the map with the
Edge of the baseplate
parallel to the North
South meridians on the
map

3 - turn the map and
compass together until
the compass needle is
"boxed" (red in shed)

That's it! You're oriented!

Map & Compass 101 – Triangulation (Continued)

- **Where am I? How about a little practice?**

  - You're somewhere along the ridgeline… but where?

  - You see 3 mountains in the distance

  - First, you orient your map

  - Then you take bearings to the mountains and get:
    - 016° to Mt. Norris
    - 048° to Cache Mountain
    - 112° to Saddle Mountain

Mt. Norris

Cache Mtn

016°

048°

112°

Saddle Mtn

So you're about here
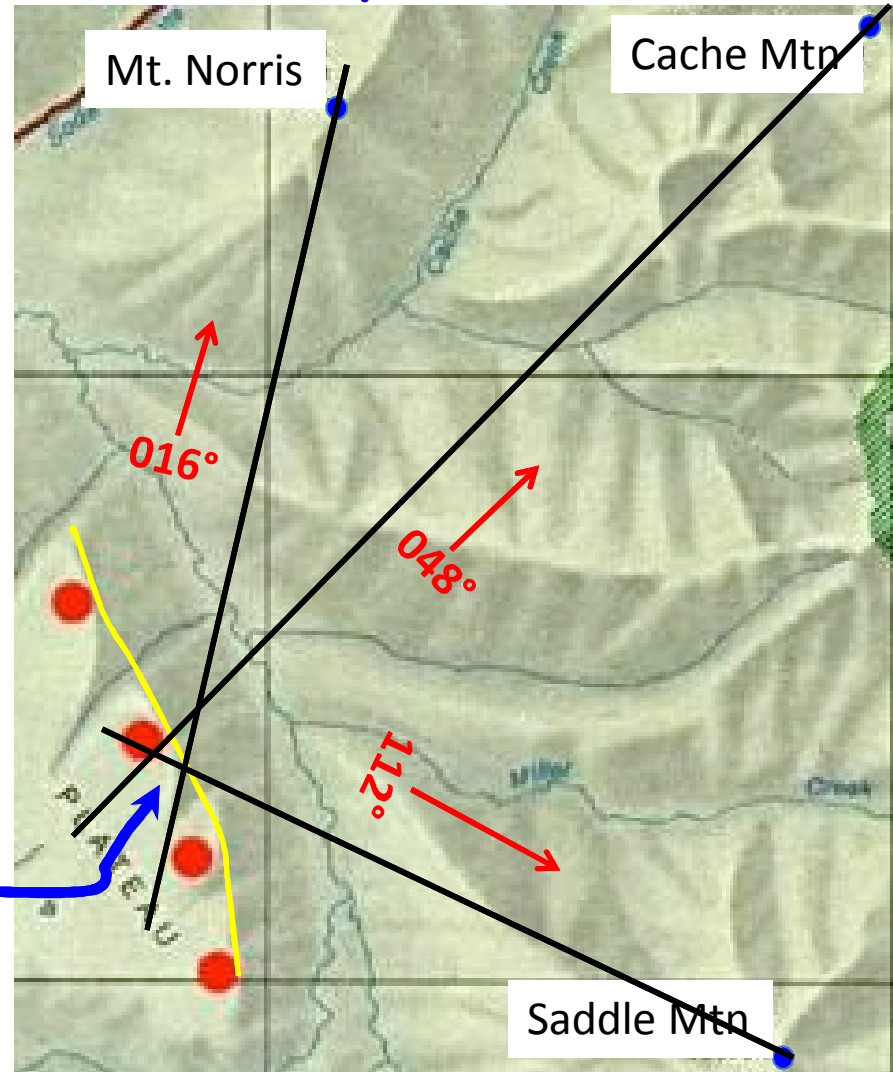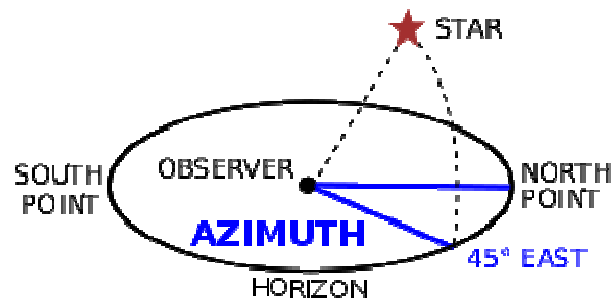
Map & Compass 101
Azimuth

An azimuth is an <u>angular measurement</u> in a <u>spherical coordinate</u> <u>system</u>. The <u>vector</u> from an observer (<u>origin</u>) to a point of interest is <u>projected</u> perpendicularly onto a reference <u>plane</u>; the angle between the projected vector and the reference vector on the reference plane is called the azimuth.

An example of an azimuth is the measurement of the position of a <u>star</u> in the sky. The star is the point of interest, the reference plane is the <u>horizon</u> or the surface of the <u>sea</u>, and the reference vector points to the <u>north</u>. The azimuth is the angle between the north point and the perpendicular projection of the star down onto the horizon (see diagram below).

Map & Compass 101
Azimuth

- Azimuth is usually measured in <u>degrees</u> (°), though other angular units (<u>grad</u>, <u>mil</u>) can also be employed.

- In land navigation, an azimuth is defined as a horizontal angle measured <u>clockwise</u> from a north base line or <u>meridian</u>. Azimuth has also been more generally defined as a horizontal angle measured clockwise from any fixed reference plane or easily established base direction line.

- Today, the reference plane for an azimuth in a general navigational context is typically <u>true north</u>, measured as a 0° azimuth. For example, moving clockwise on a 360° degree circle, a point due east would have an azimuth of 90°, south 180°, and west 270°. The azimuth cannot exceed the highest number of units in a circle – for a 360° circle, this is 359 degrees, 59 minutes, 59 seconds (359° 59' 59").