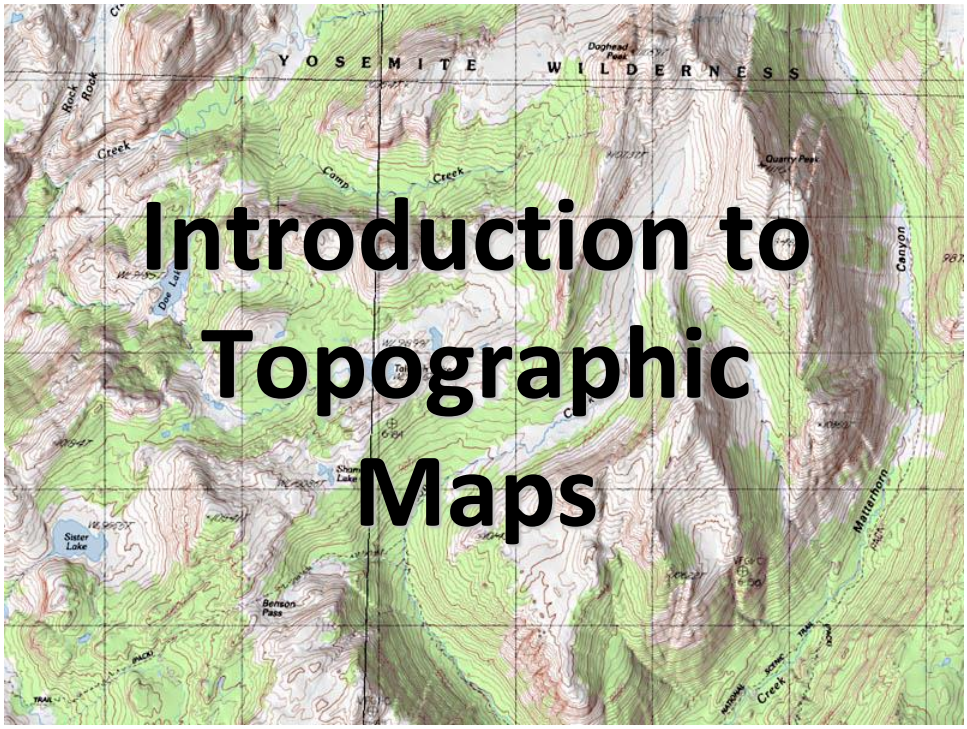
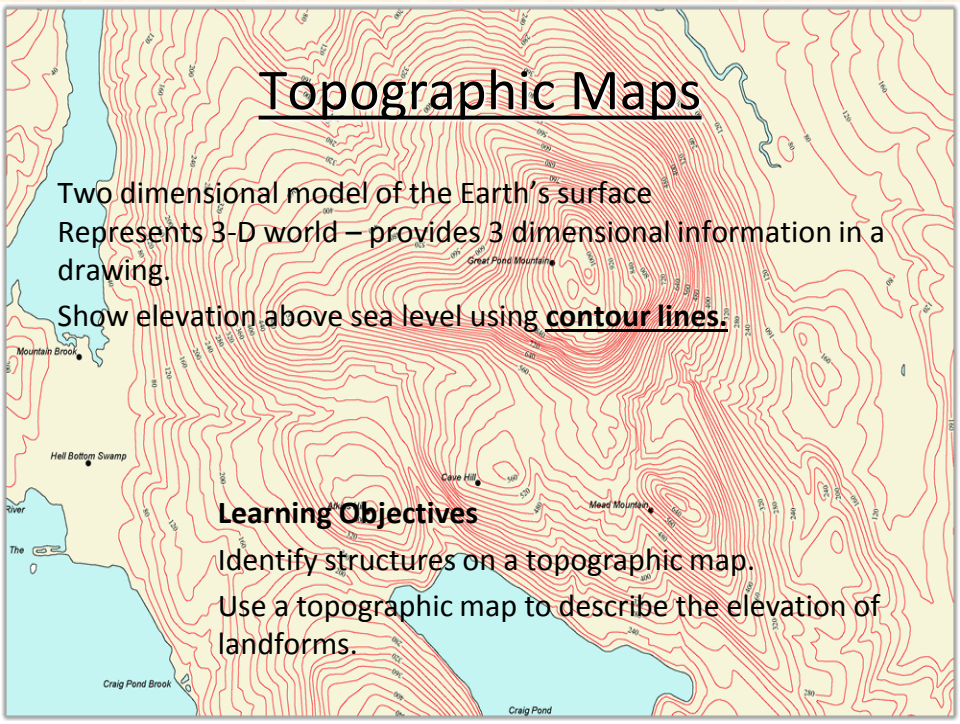


Introduction to Topographic Maps



Topographic Maps

Two dimensional model of the Earth's surface

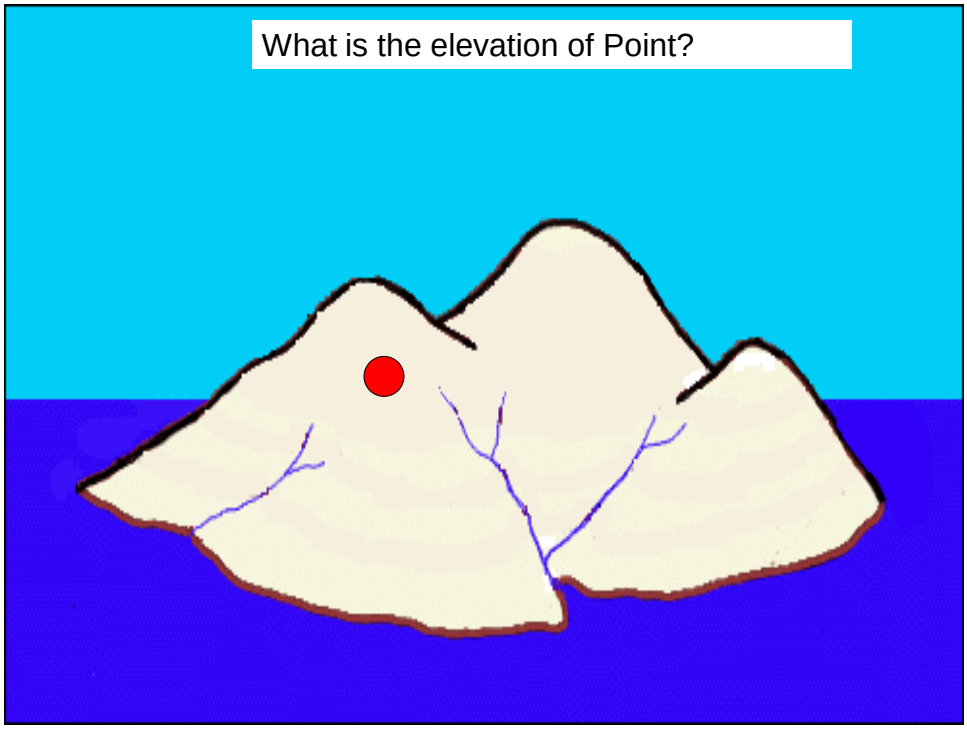
Represents 3-D world – provides 3 dimensional information in a drawing.

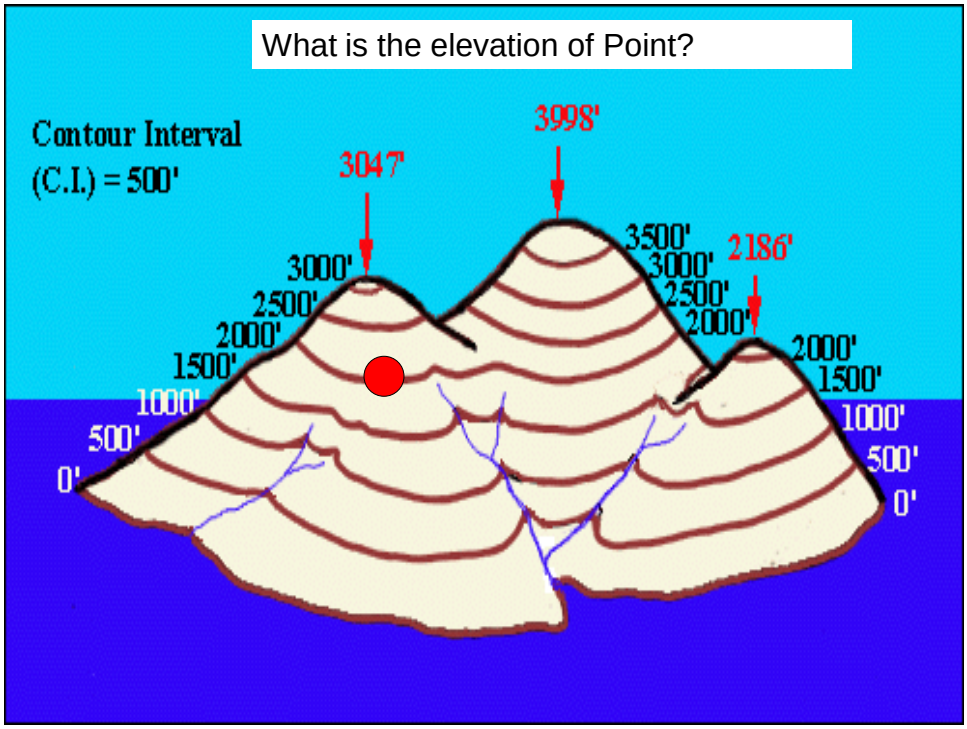
Show elevation above sea level using **contour lines.**

Learning Objectives

Identify structures on a topographic map.

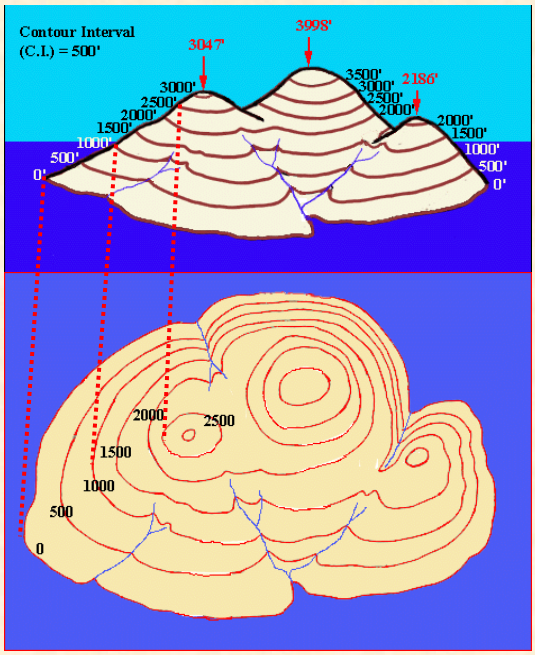
Use a topographic map to describe the elevation of landforms.


What is the elevation of Point?


What is the elevation of Point?
Contour Interval
(C.I.) = 500'
3047'
3998'
2186'
3000'
2500'
2000'
1500'
1000'
500'
0'
3500'
3000'
2500'
2000'
2000'
1500'
1000'
500'
0'

"Real World"

Contour Map



Contour Lines

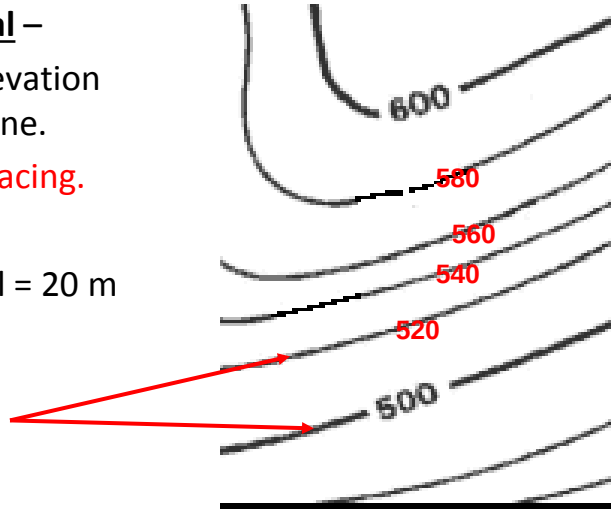
- line on a map that connects points of EQUAL elevation.
- show elevation and shape of the land

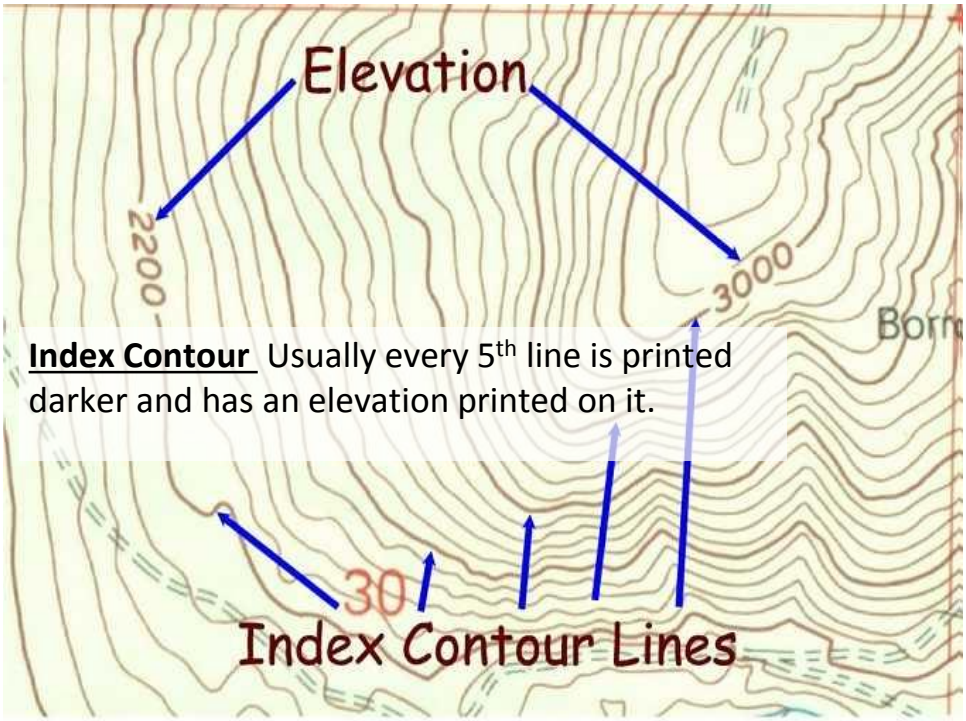
Shows Change in Elevation between Contour Lines and the Shape of the Terrain

- **<u>Contour Interval</u>** – difference in elevation between each line.

MUST be equal spacing.

Contour interval = 20 m

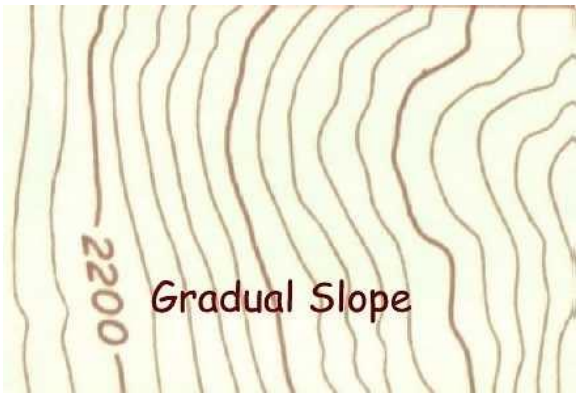




<u>Index Contour</u> Usually every 5th line is printed darker and has an elevation printed on it.

Rules for Contours

1. Contour lines never cross



Rules for Contours

2. Contours form closed loops
   (even if not shown of the map.

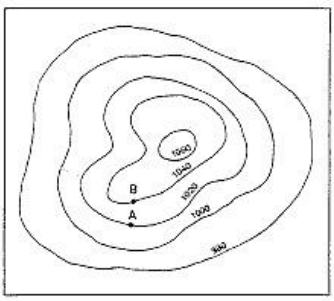
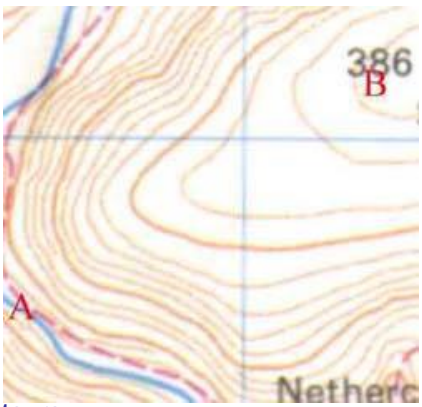


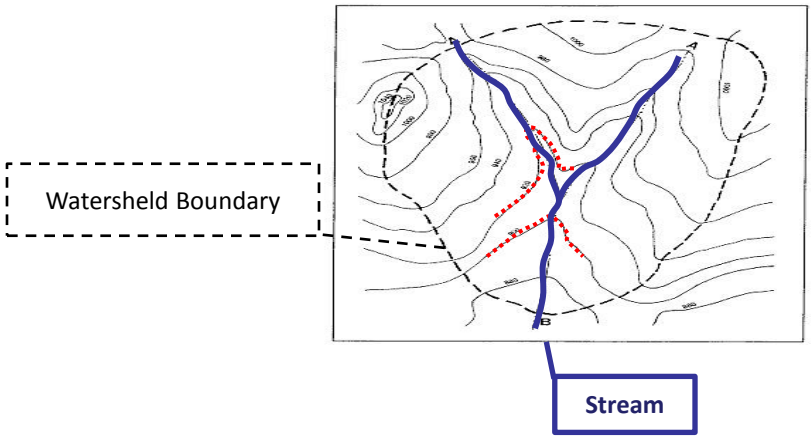
Figure E-1 Isolated Hill

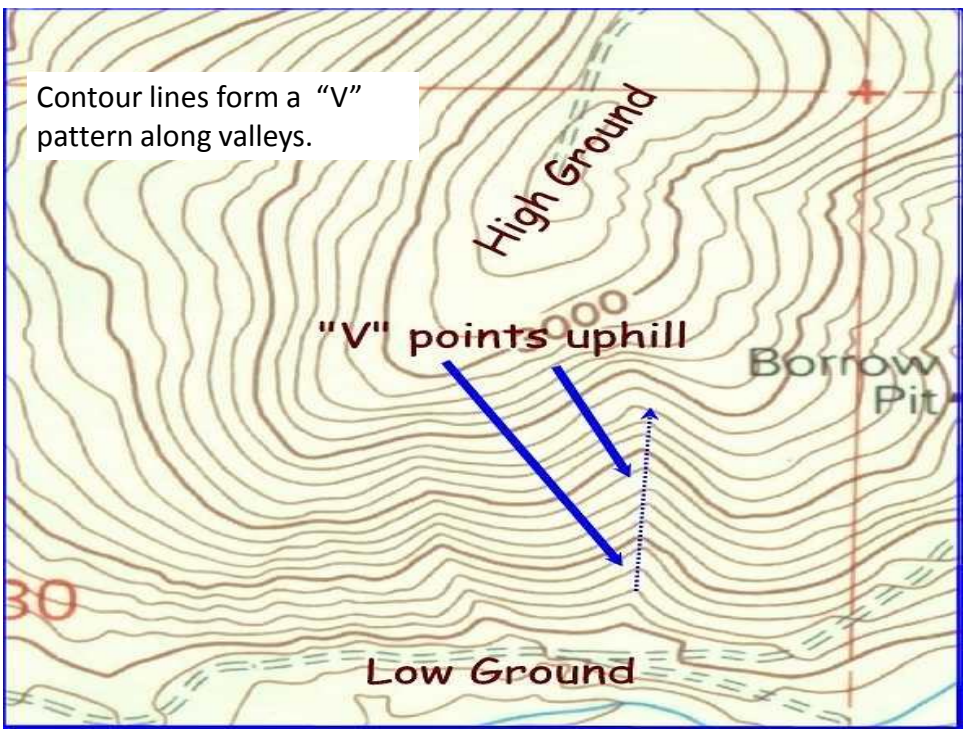


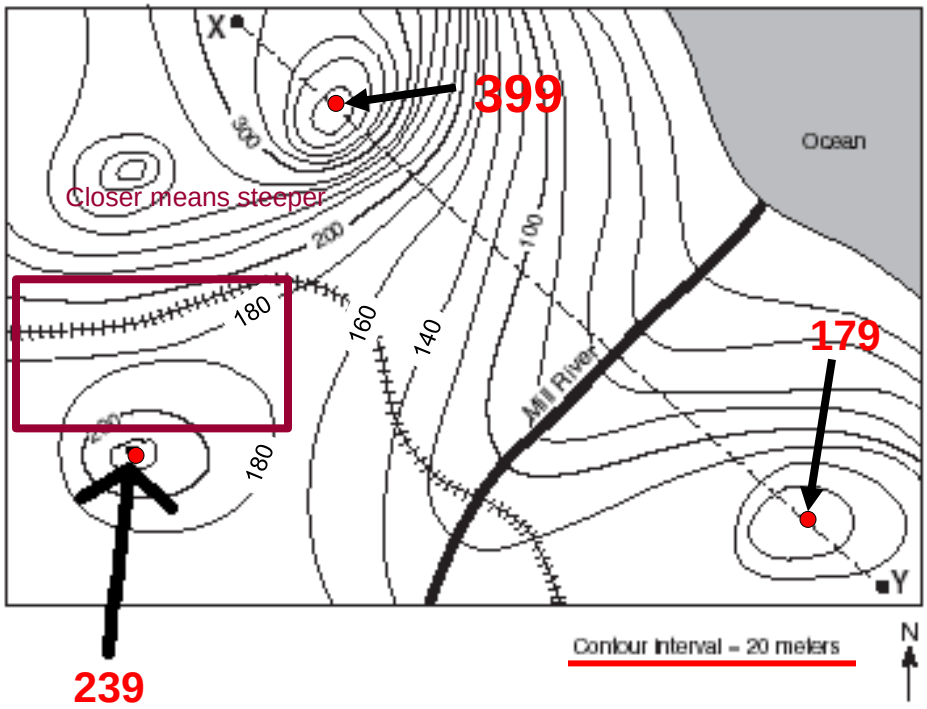
Hills are shown as closed concentric contours

Rules for Contours

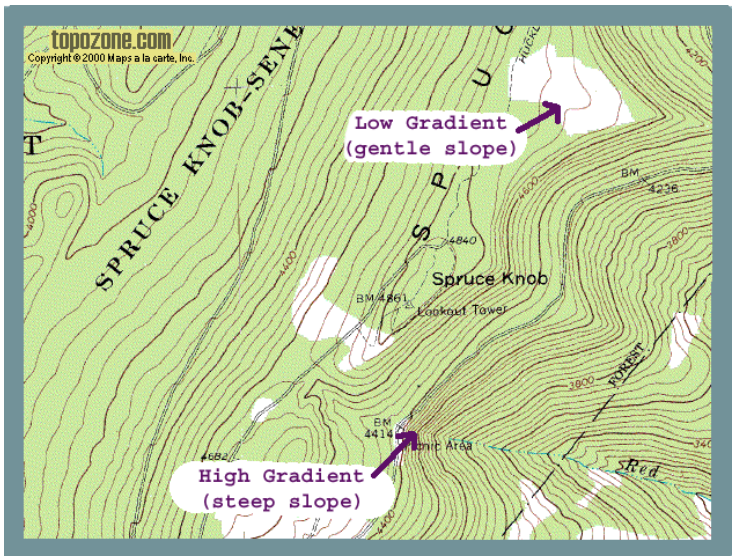
3. Contours bend <u>upstream</u> (uphill) when crossing a stream.





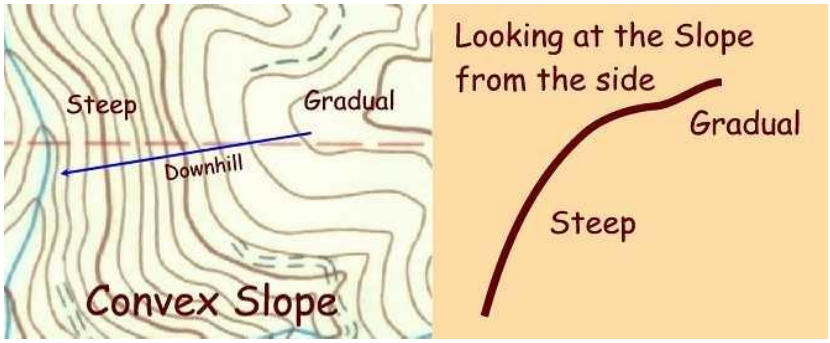


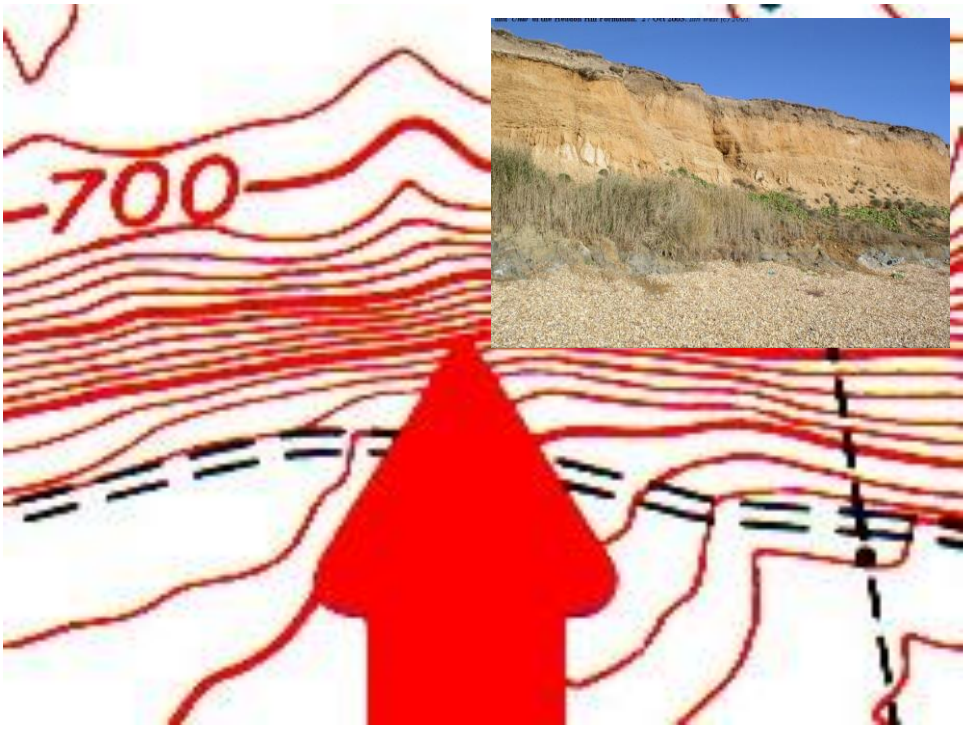
Notice how the contour lines are used to show how gentle or steep the slope is.



Closely Spaced Contours

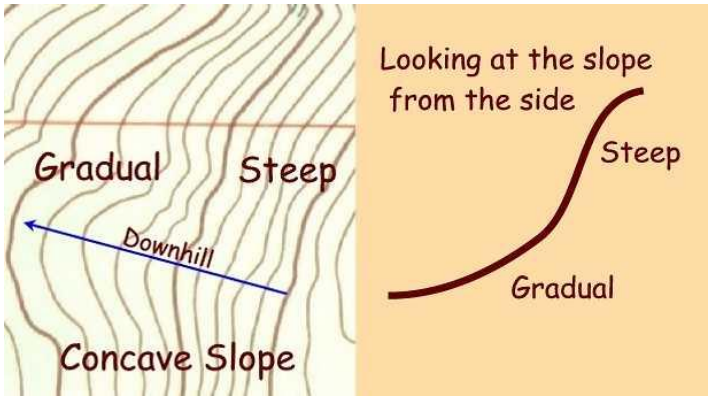
- Steeper Slope (Gradient) – contour lines are closer together.

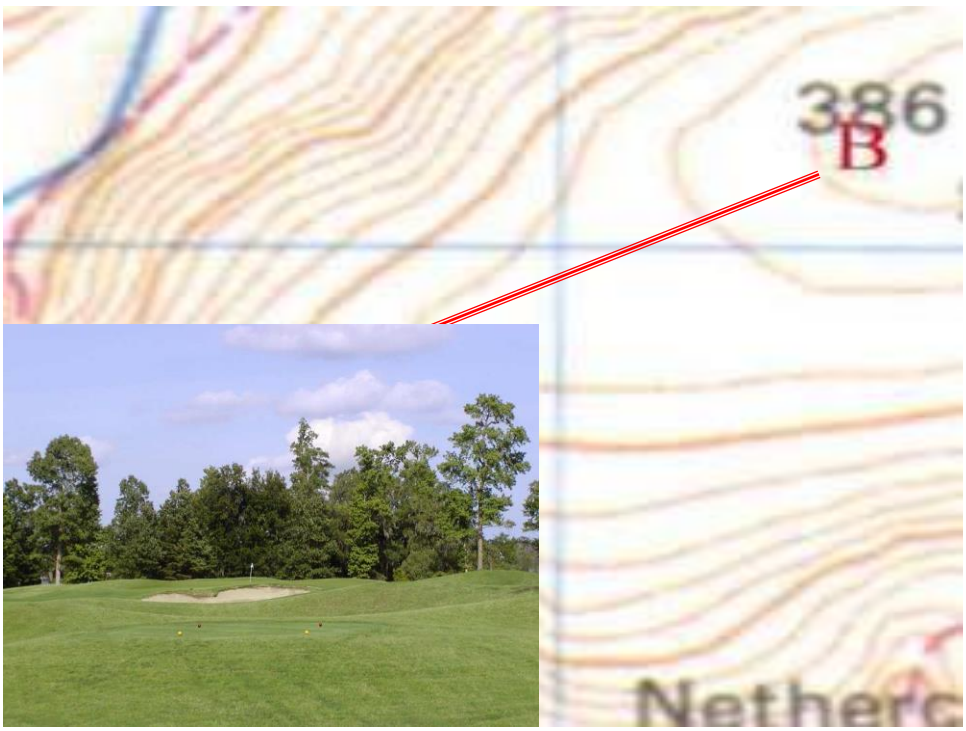


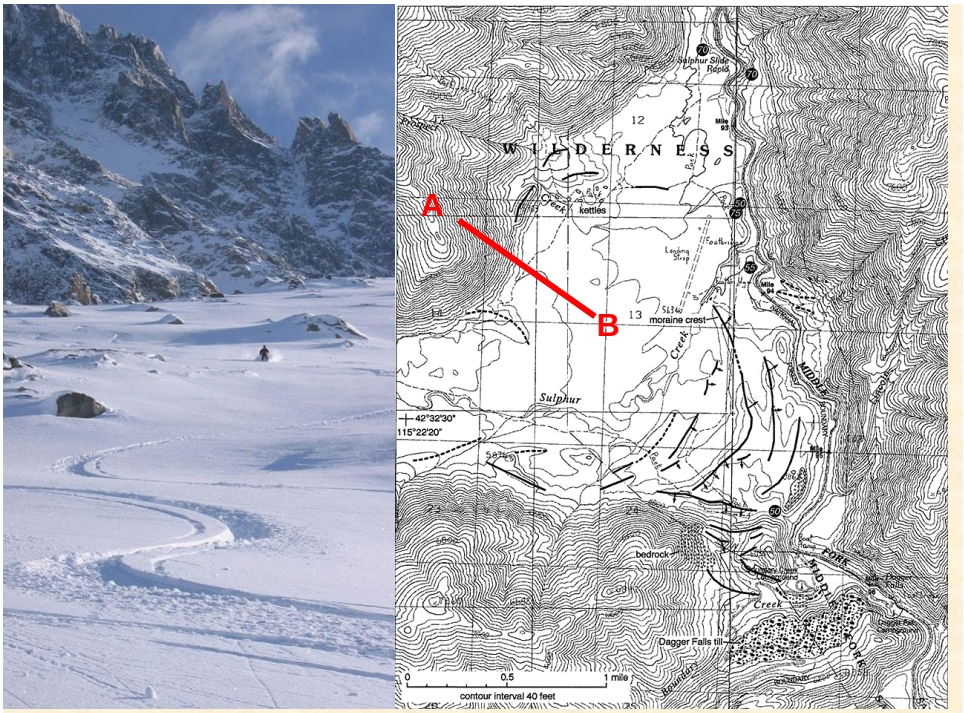


Wide Spaced Contours

- Gradual/Gentle Slope (Gradient) – contour lines are farther apart.



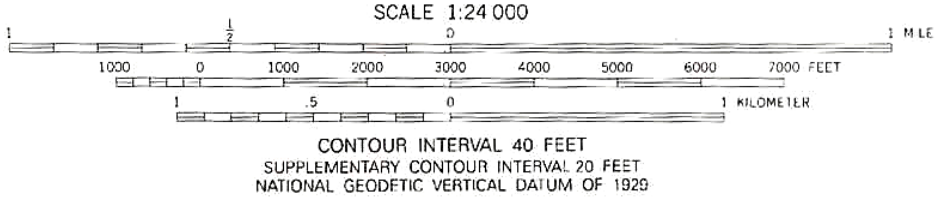




Map Scales

- Indicates the distance on the map compared to distance in the real world

- Graphical - by a line divided into equal parts and marked in units of length.

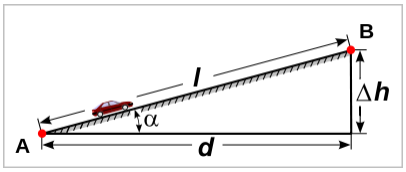


Map Scales

- Numerically – usually by writing a fraction to show what part of the true distances map distances really are.
  - 1:63,360
- One inch on the map equals 63,360 Inches in the real world.
  (There are 63,360 inches in a mile)

Slope (Gradient) – Rise over Run

$$slope = \tan\alpha = \frac{rise}{run}$$



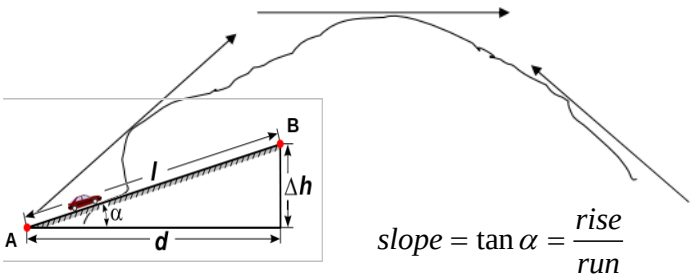
d = run
Δh = rise
α = angle of inclination

12% slope warning sign,

Slope (Gradient) – tan α

α – inclination of the tangent plane

Slope varies by direction.
At a peak or pit slope becomes 0.



$$slope = \tan\alpha = \frac{rise}{run}$$

Exercise:

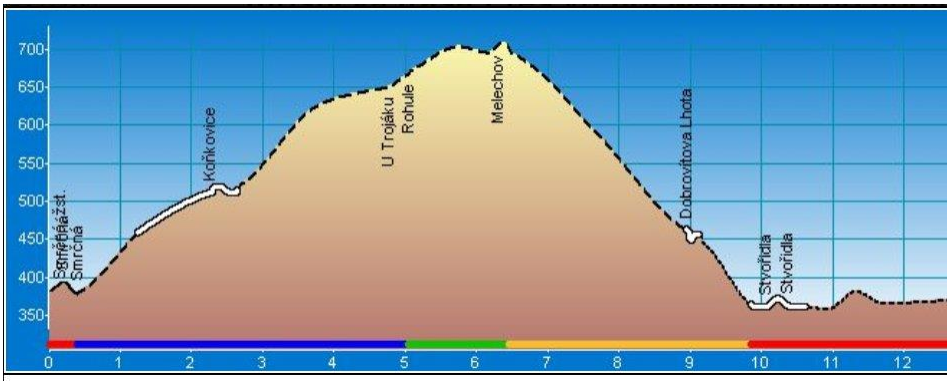
Slope between two points on a hill

- A trail is **4** km long as measured by the scale on a map. The beginning of the trail is at the 1 060 m contour line and the end of the trail is at the 960 m contour line. Calculate the gradient of the trail.

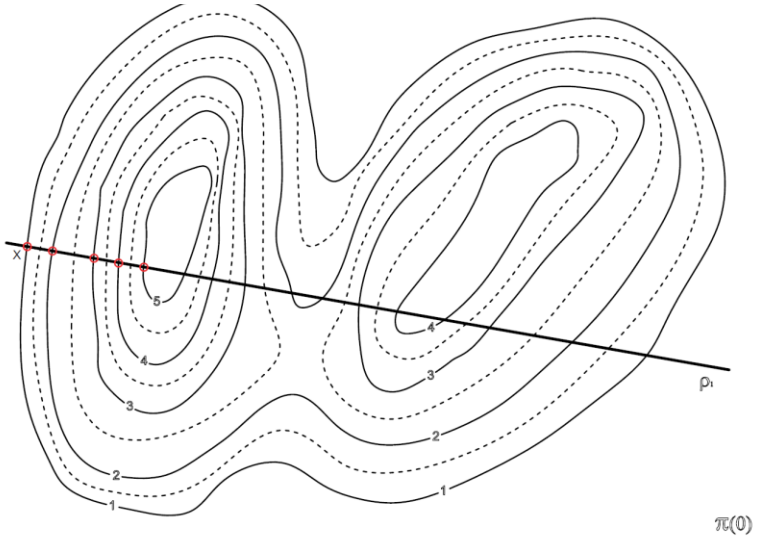
$$\text{Gradient} = \frac{1060\text{ m} - 960\text{ m}}{4\text{ km}} = 25\text{ m/km}$$

Cross profile

- Cross-sectional view of a portion of a topographic map
- Used to demonstrate the vertical scale of landforms
- Usually use **exaggerated** scale – to emphasize differences between the slope.



Cross Profile



Cross Profile