Section 9

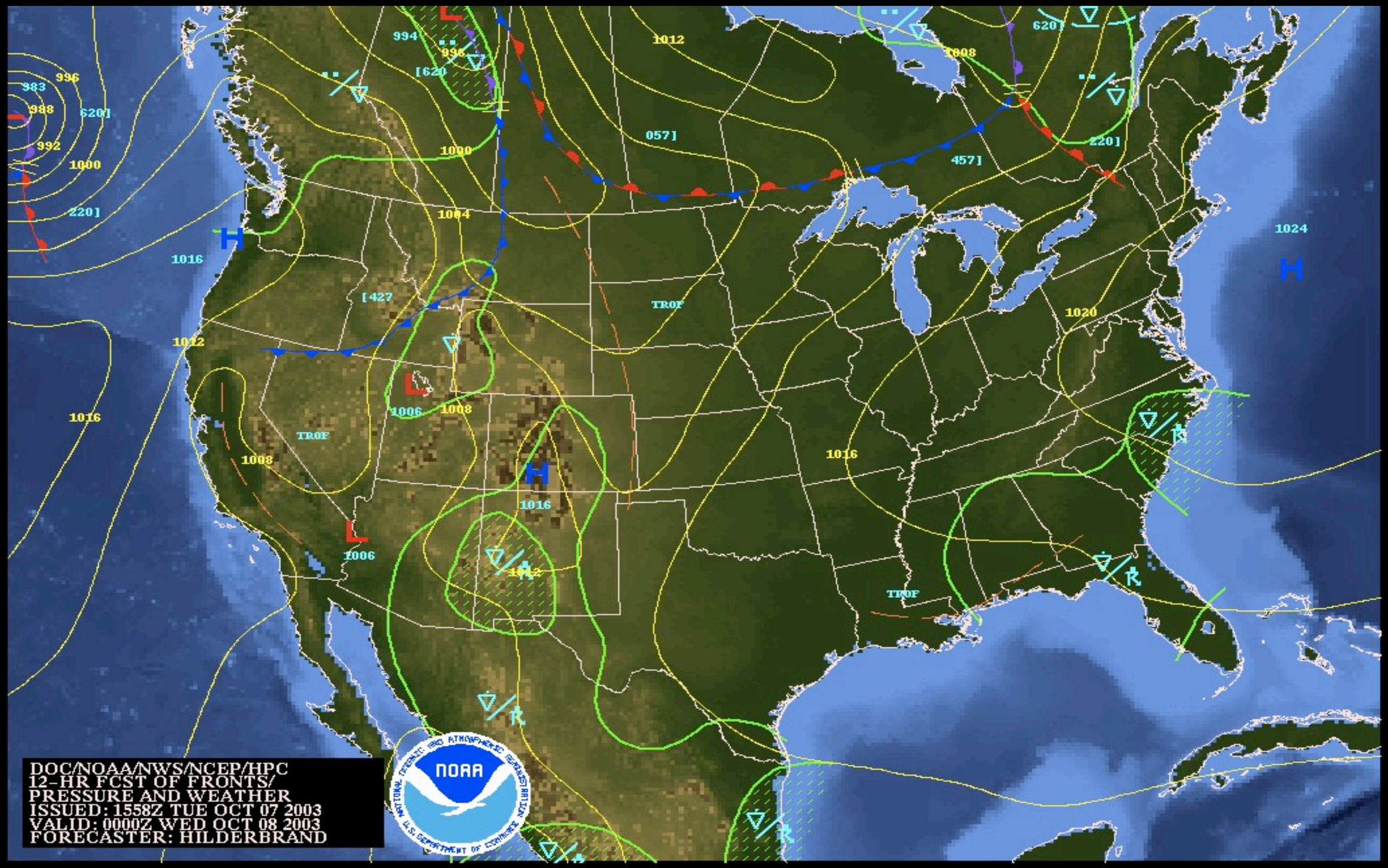


Fields and Maps

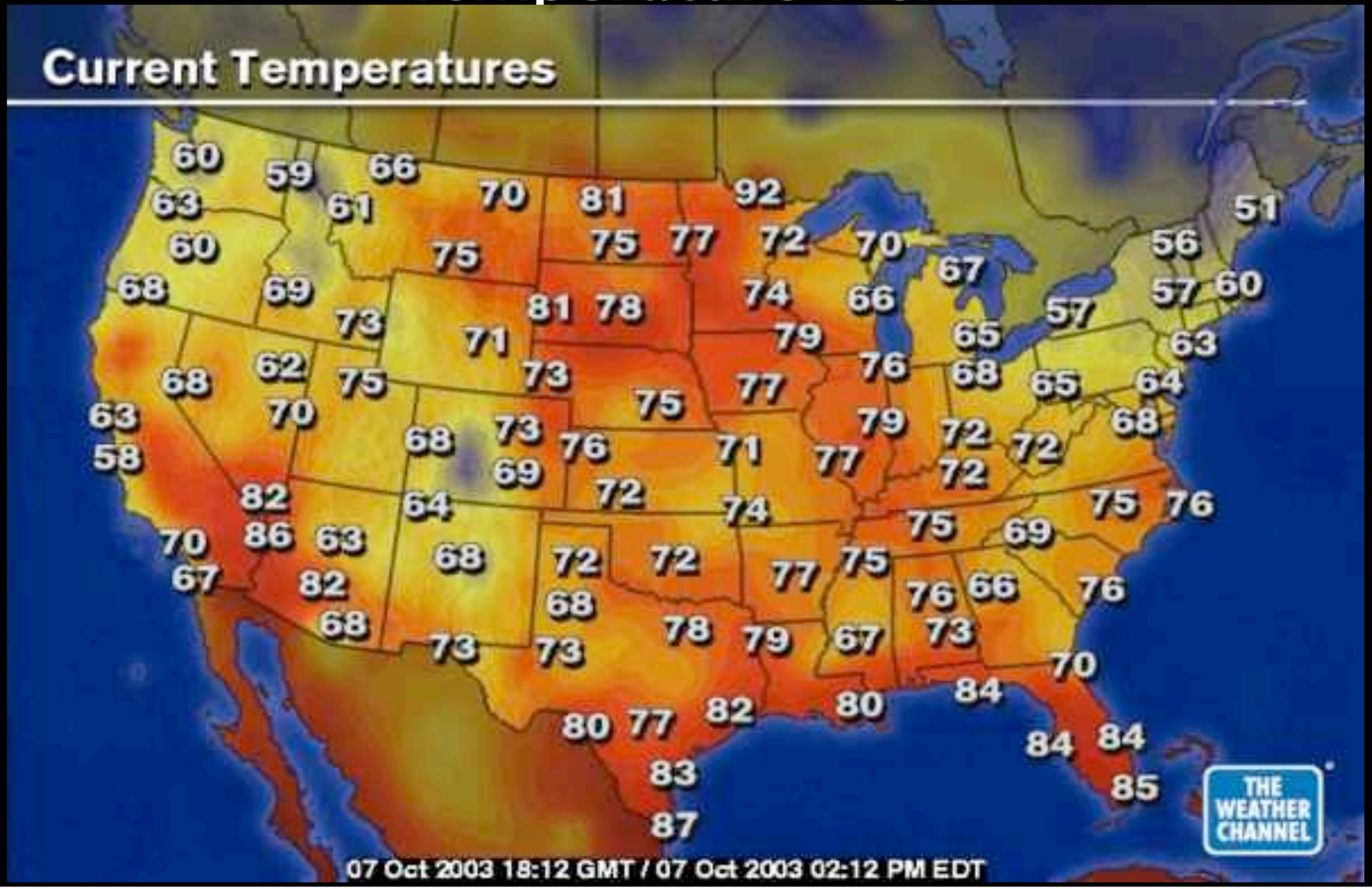
A. What are Fields???

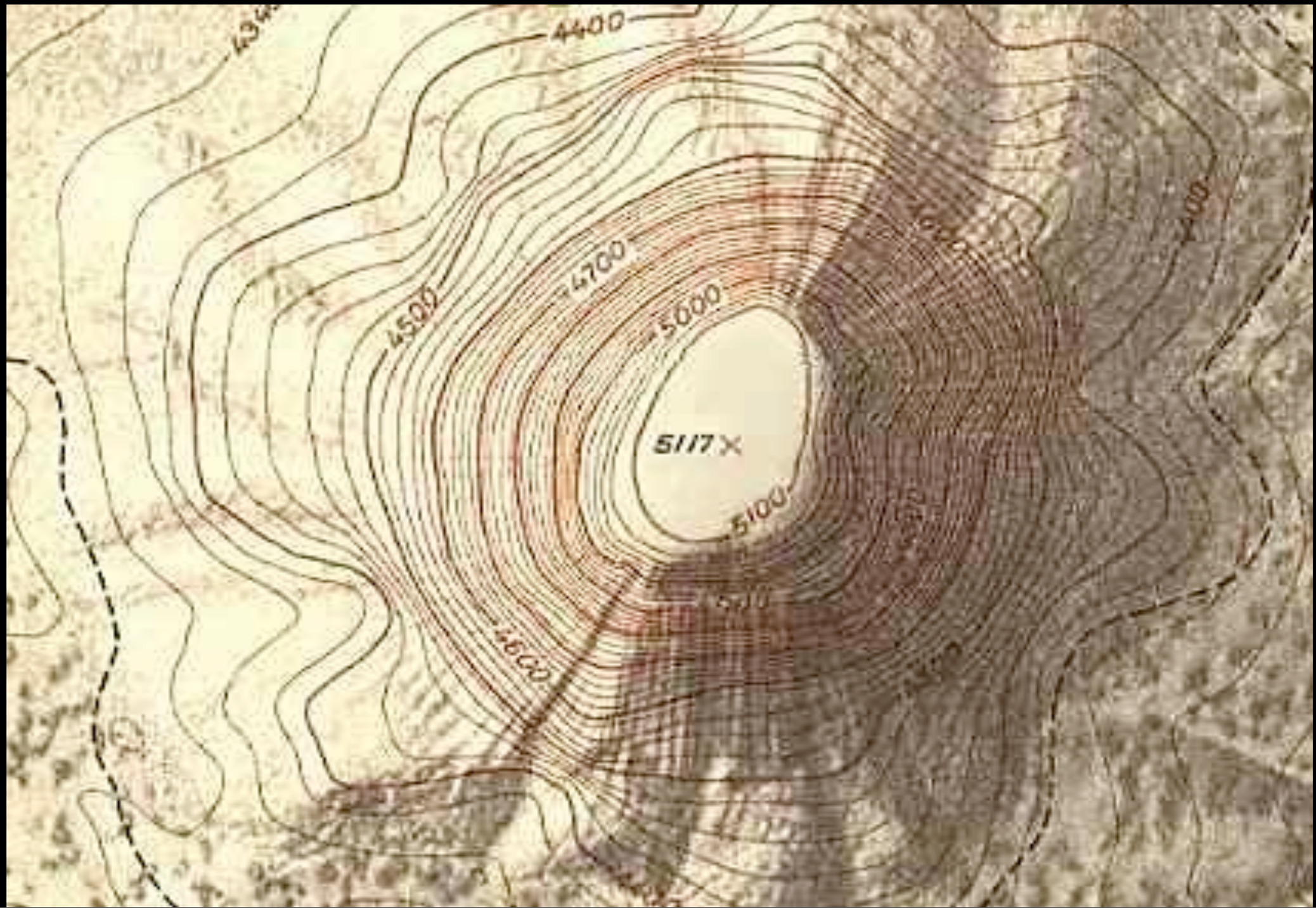
- Are a region of space
- Similar quantities can be measured at every point or location
- Wind Speed, Temperature, Pressure, Elevation and Earth's Magnetic Field
- Source: Where energy comes from
- Sink: Where energy goes

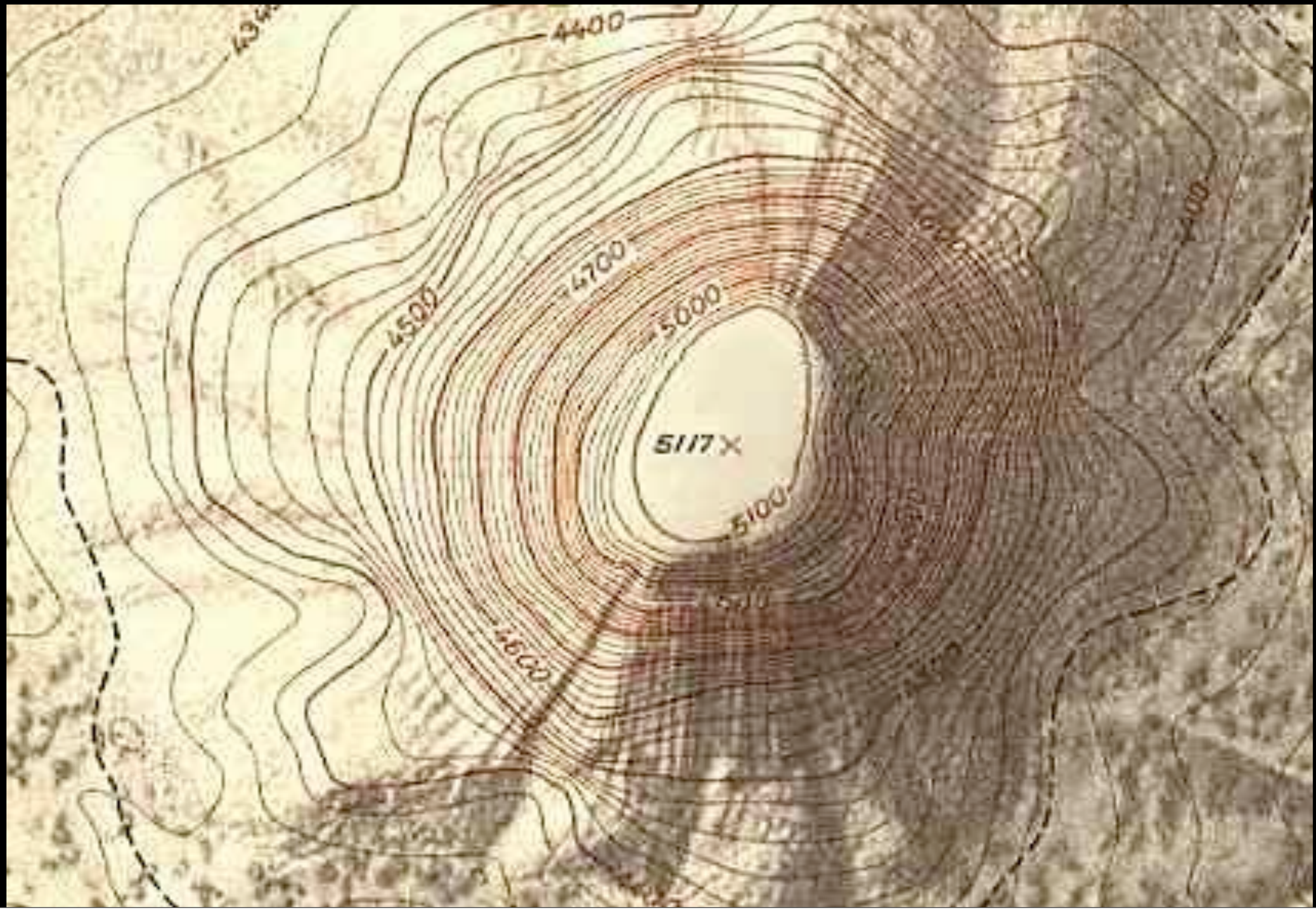
Pressure Field

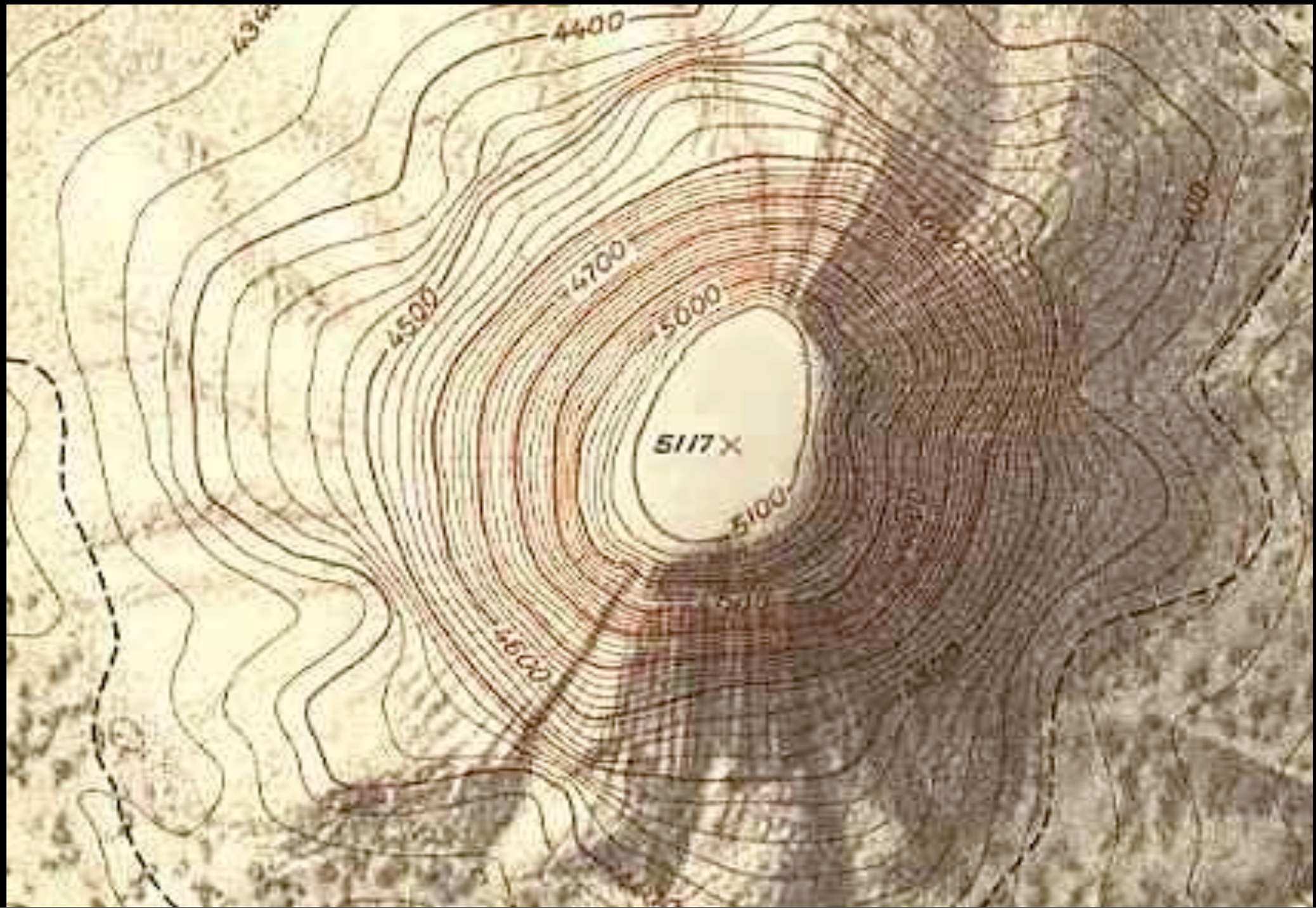


Temperature Field




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B. Earth's Magnetic Field

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- Iron and Nickel Core act as a bar magnet inside the Earth

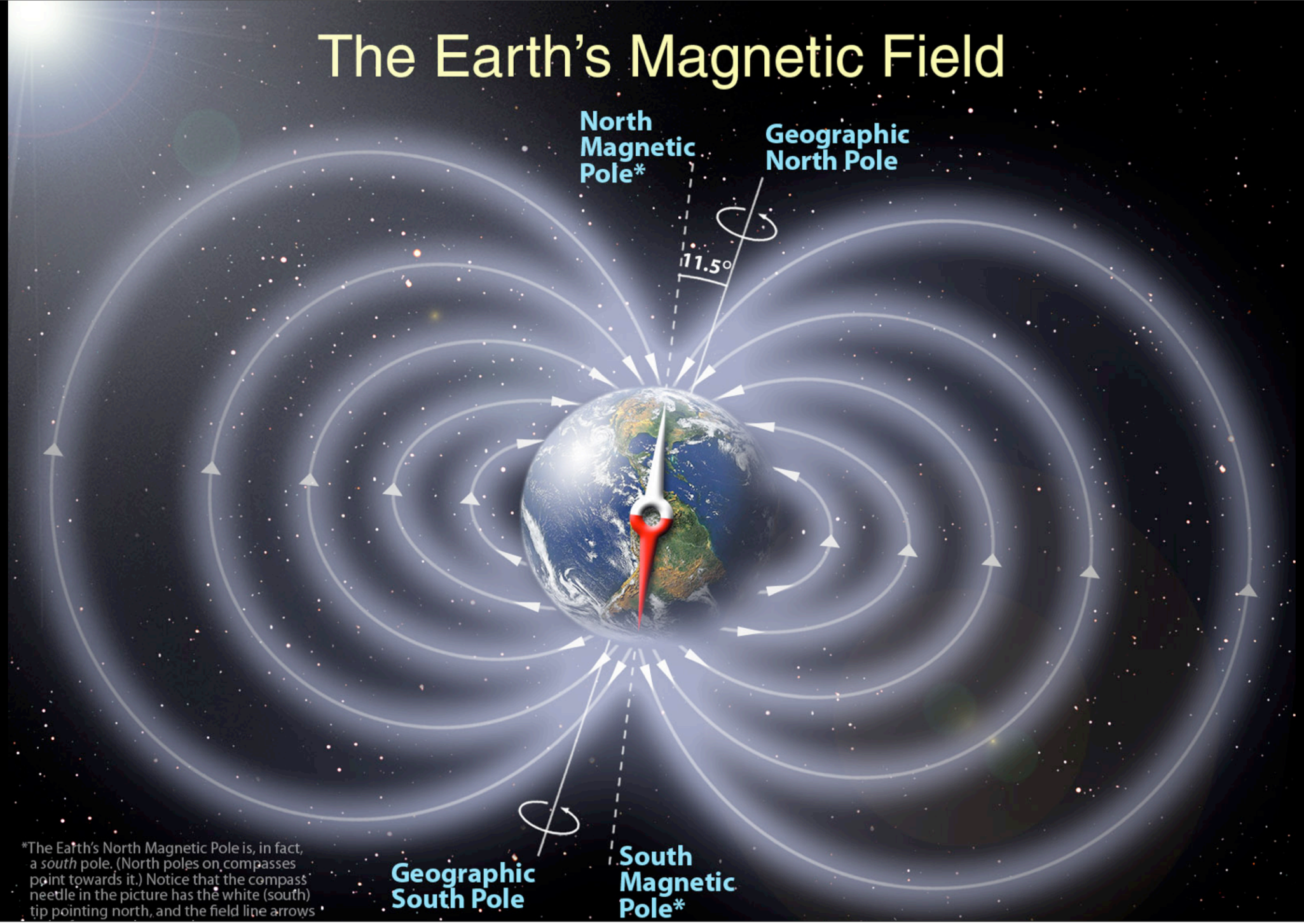
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- Due to the rotation…causes an electrical field to form

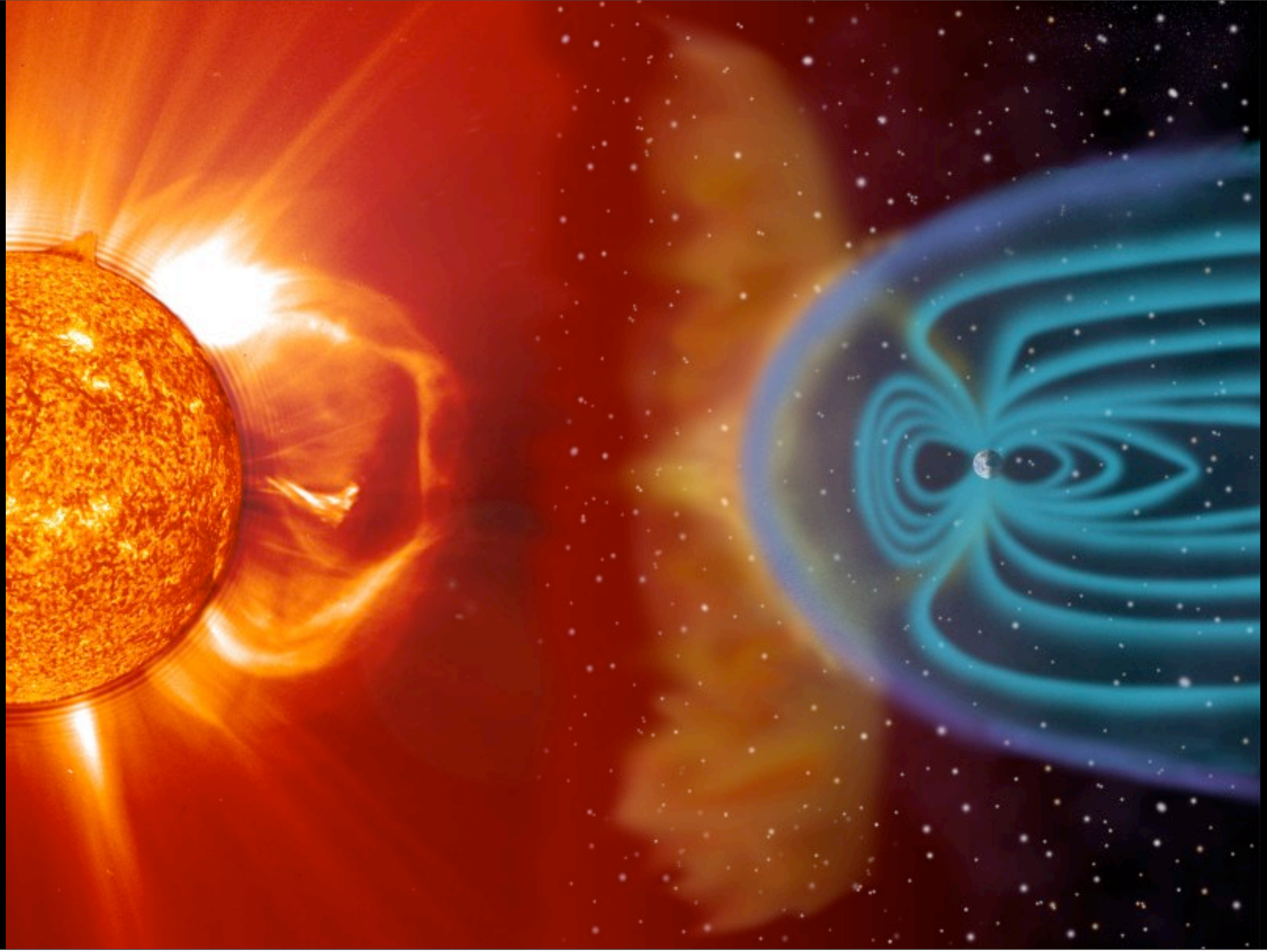
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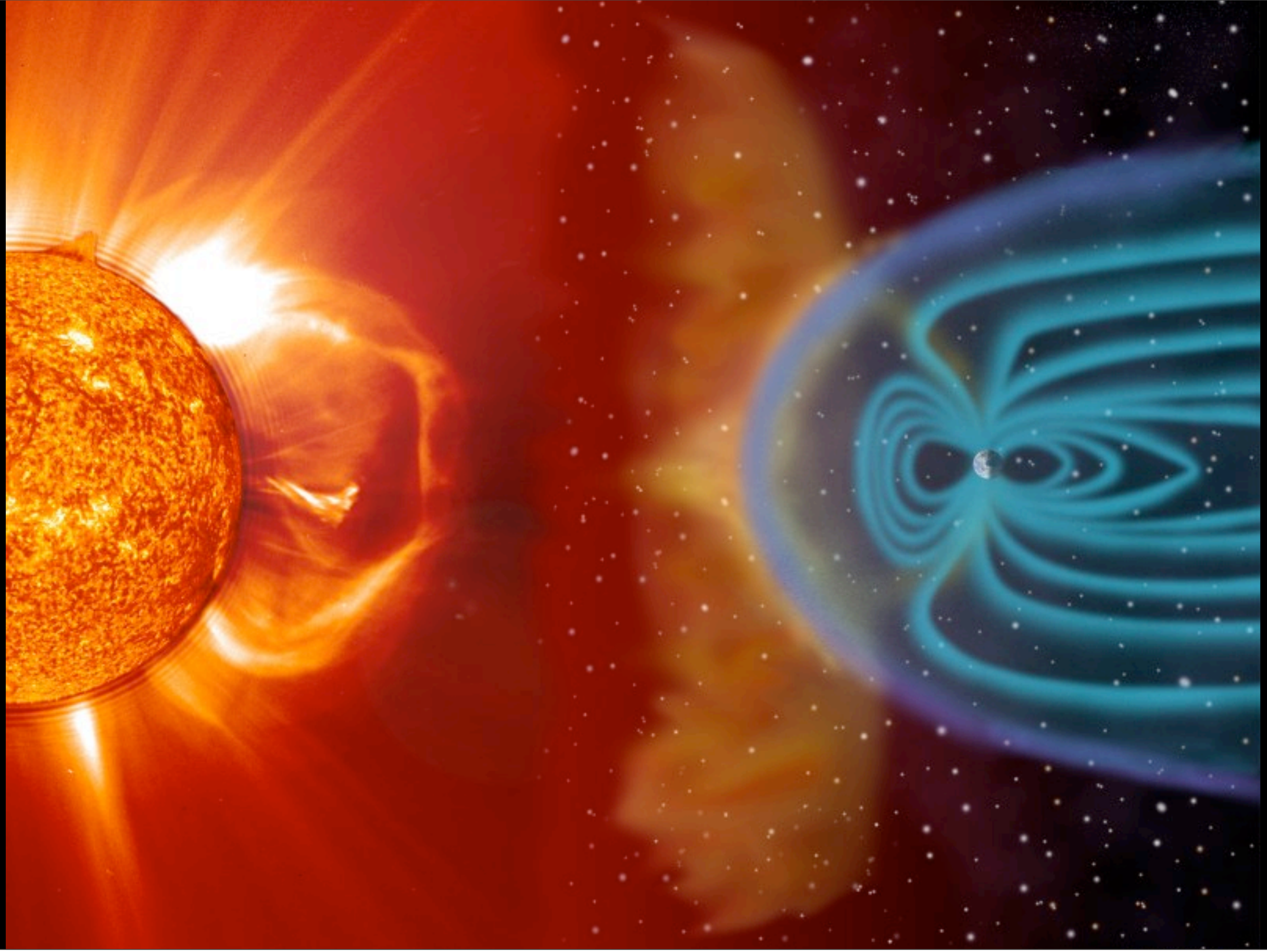
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- Lines up within about 12 degrees of earth's axis of rotation
- Compass needle lines up close with geographic north pole (magnetic north)
- Iron and Nickel Core act as a bar magnet inside the Earth
- Due to the rotation…causes an electrical field to form
- Proof is due to compass needle and magnetic minerals such as magnetite

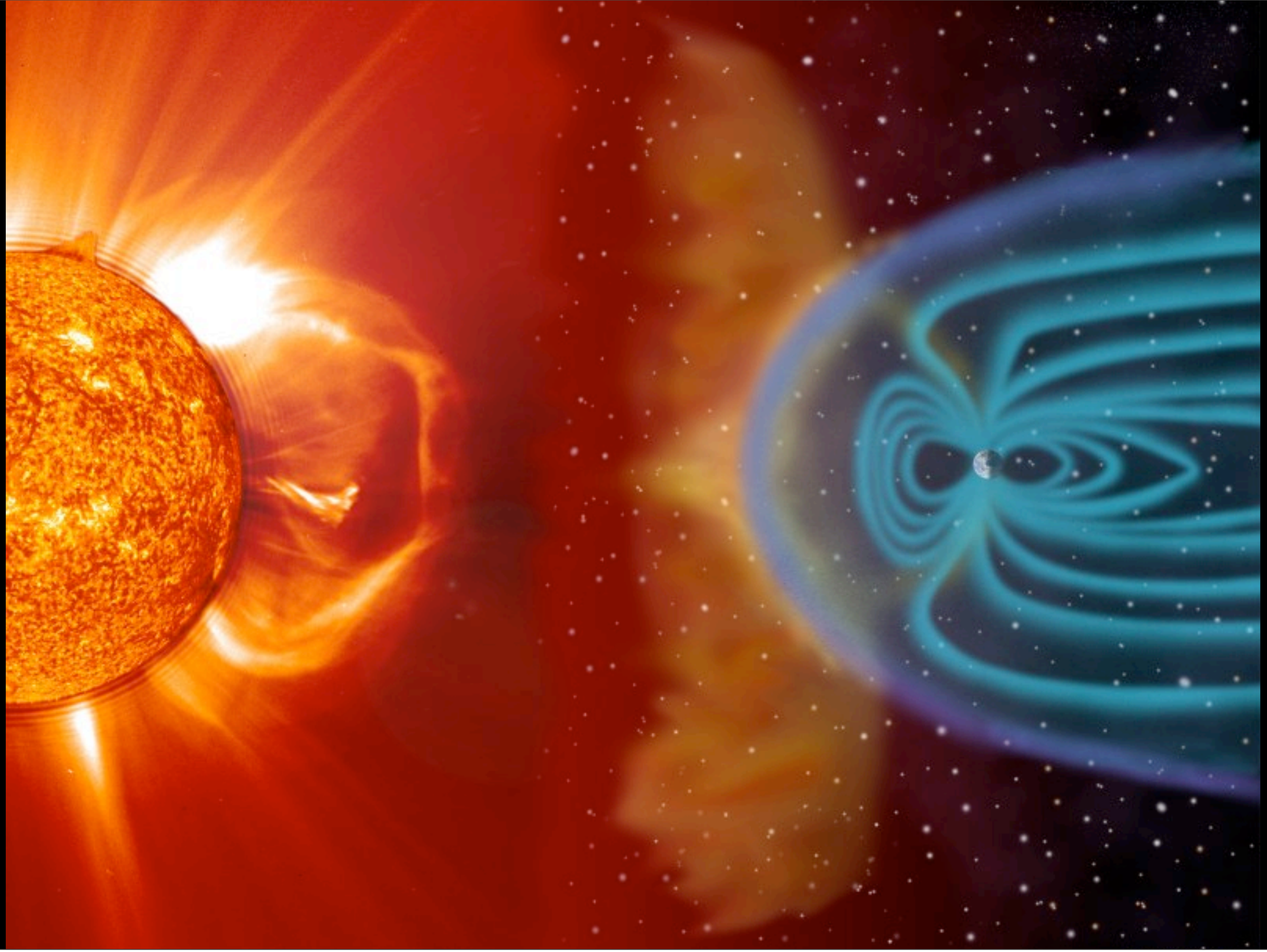
The Earth's Magnetic Field



*The Earth's North Magnetic Pole is, in fact, a *south* pole. (North poles on compasses point towards it.) Notice that the compass needle in the picture has the white (south) tip pointing north, and the field line arrows









Thursday, June 3, 2010



Thursday, June 3, 2010



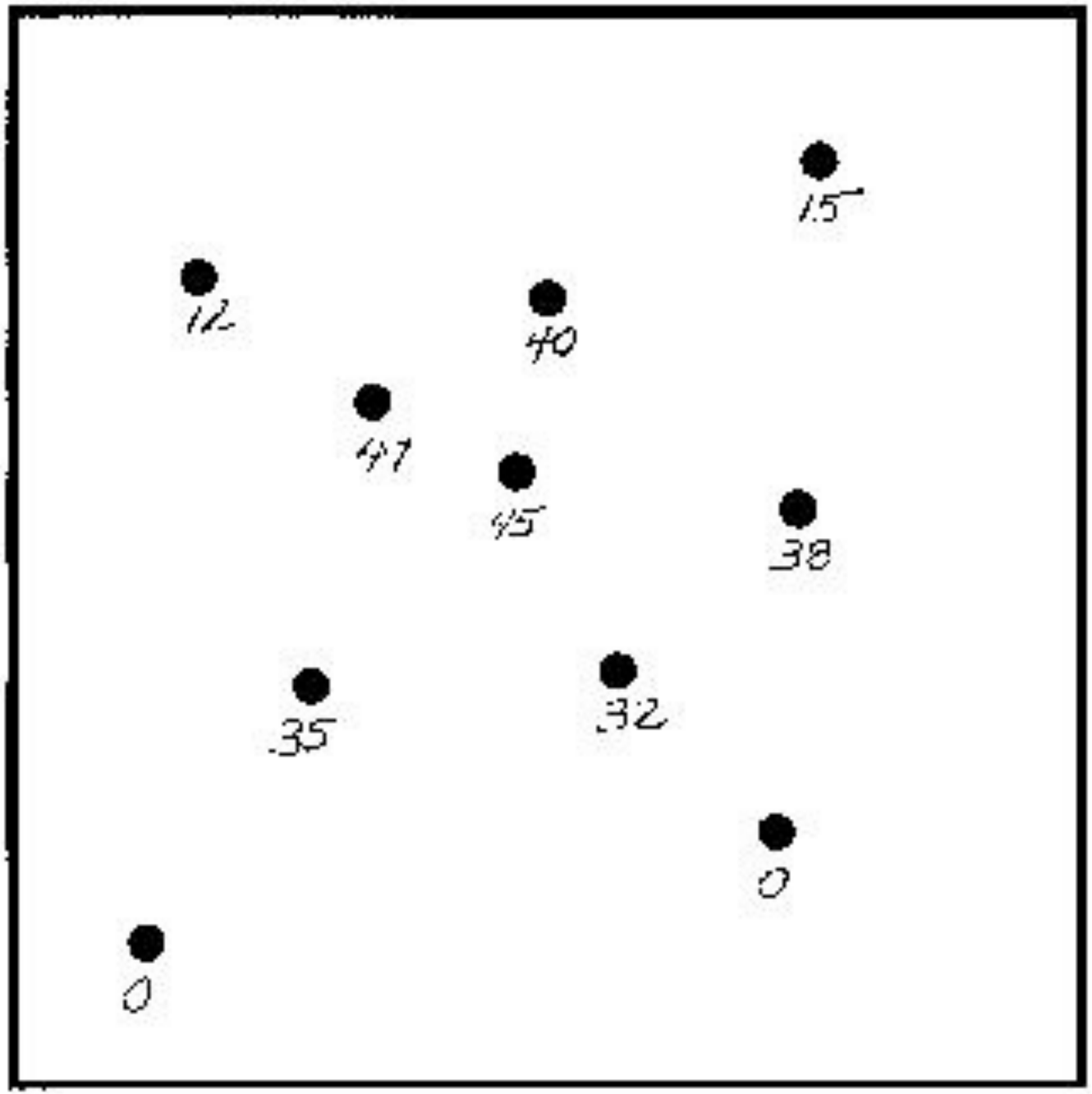
Thursday, June 3, 2010

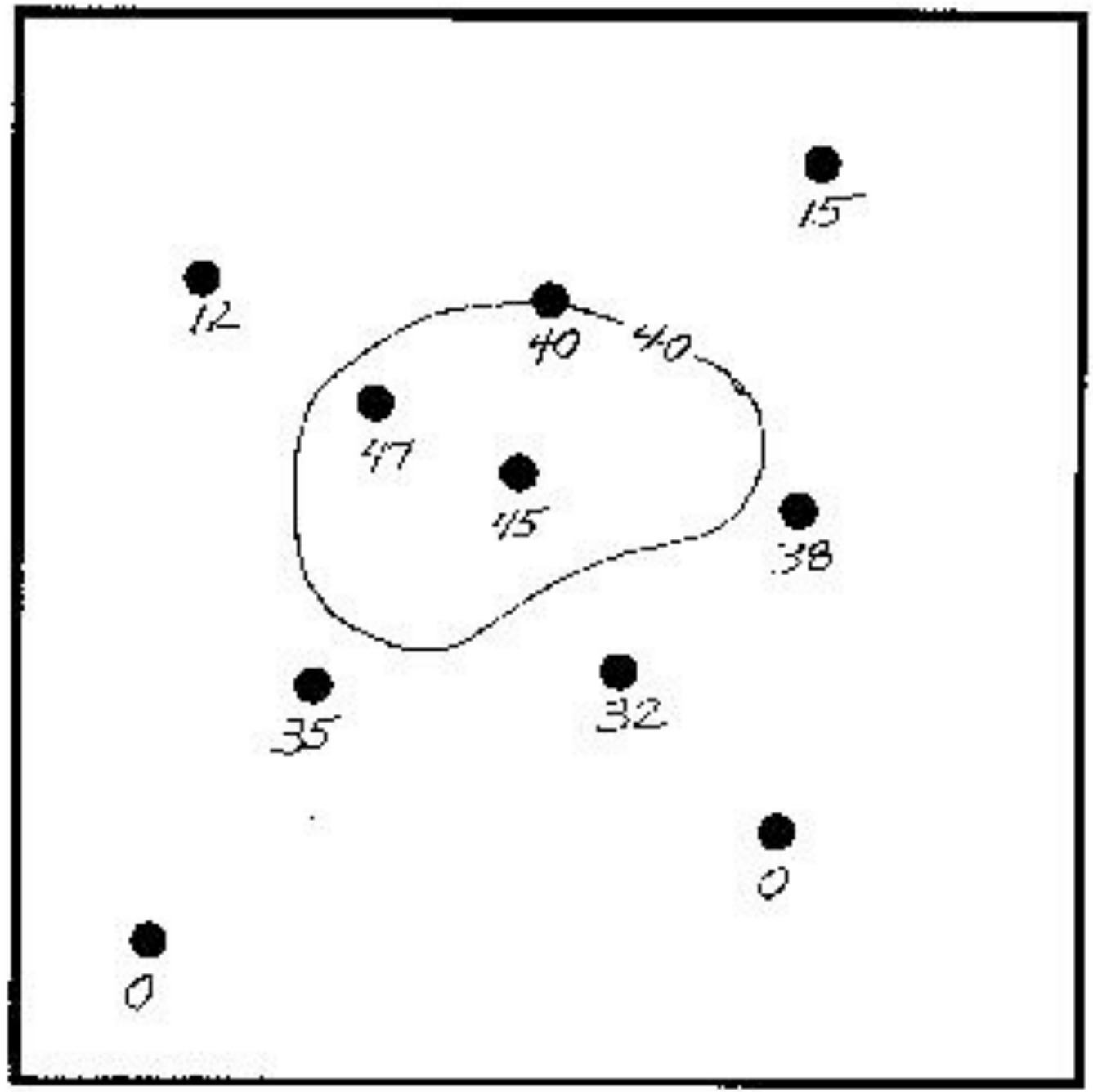
C. Isolines:

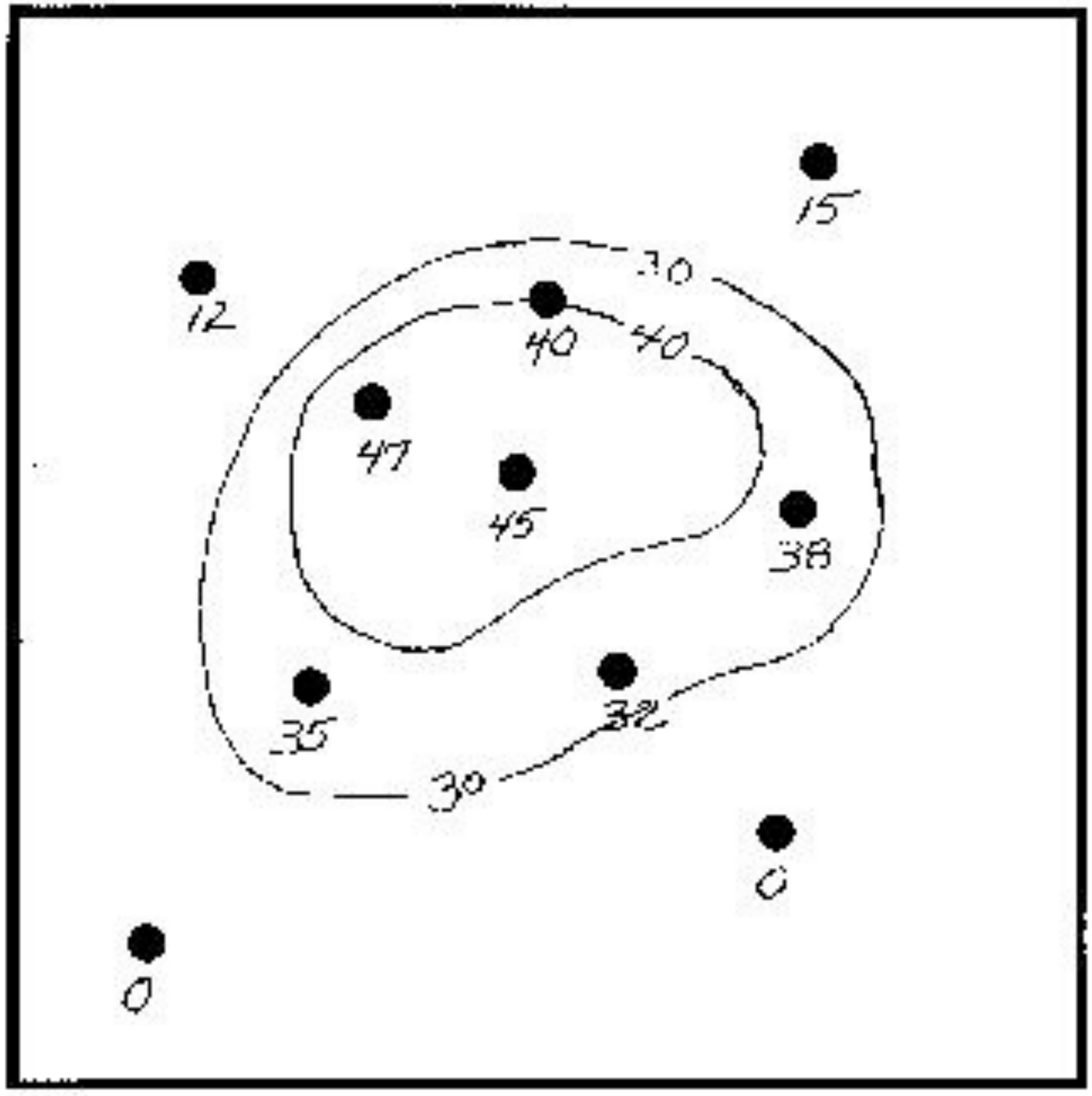
- Connect points of equal value on a field map
- ISO means "the same"
  - **<u>Isotherms:</u>** connect points of equal temperature
  - **<u>Isobars</u>**: connect points of equal air pressure
  - **<u>Contour Lines</u>**: connect points of equal elevation

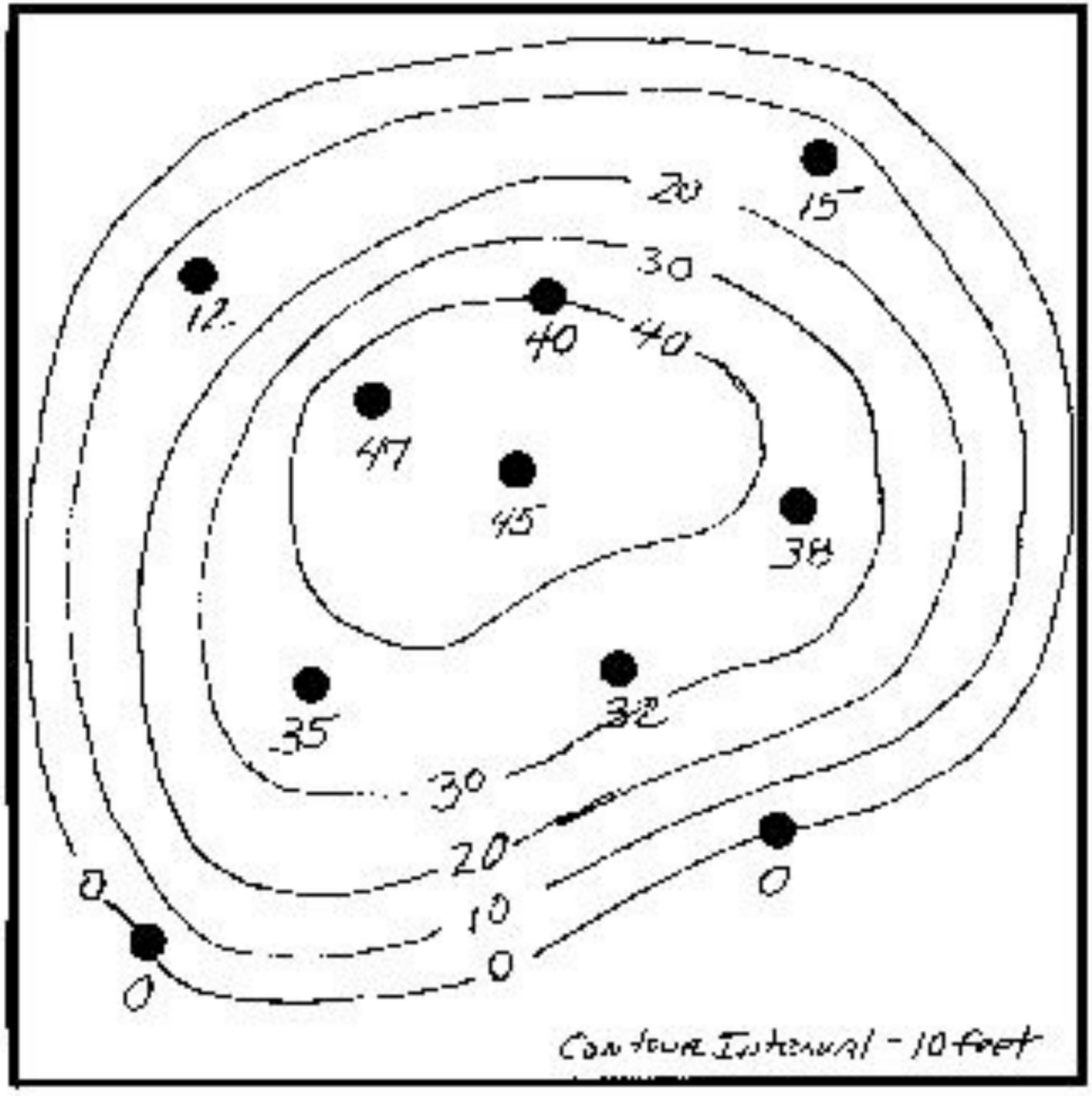
D. Rules for Drawing Isolines

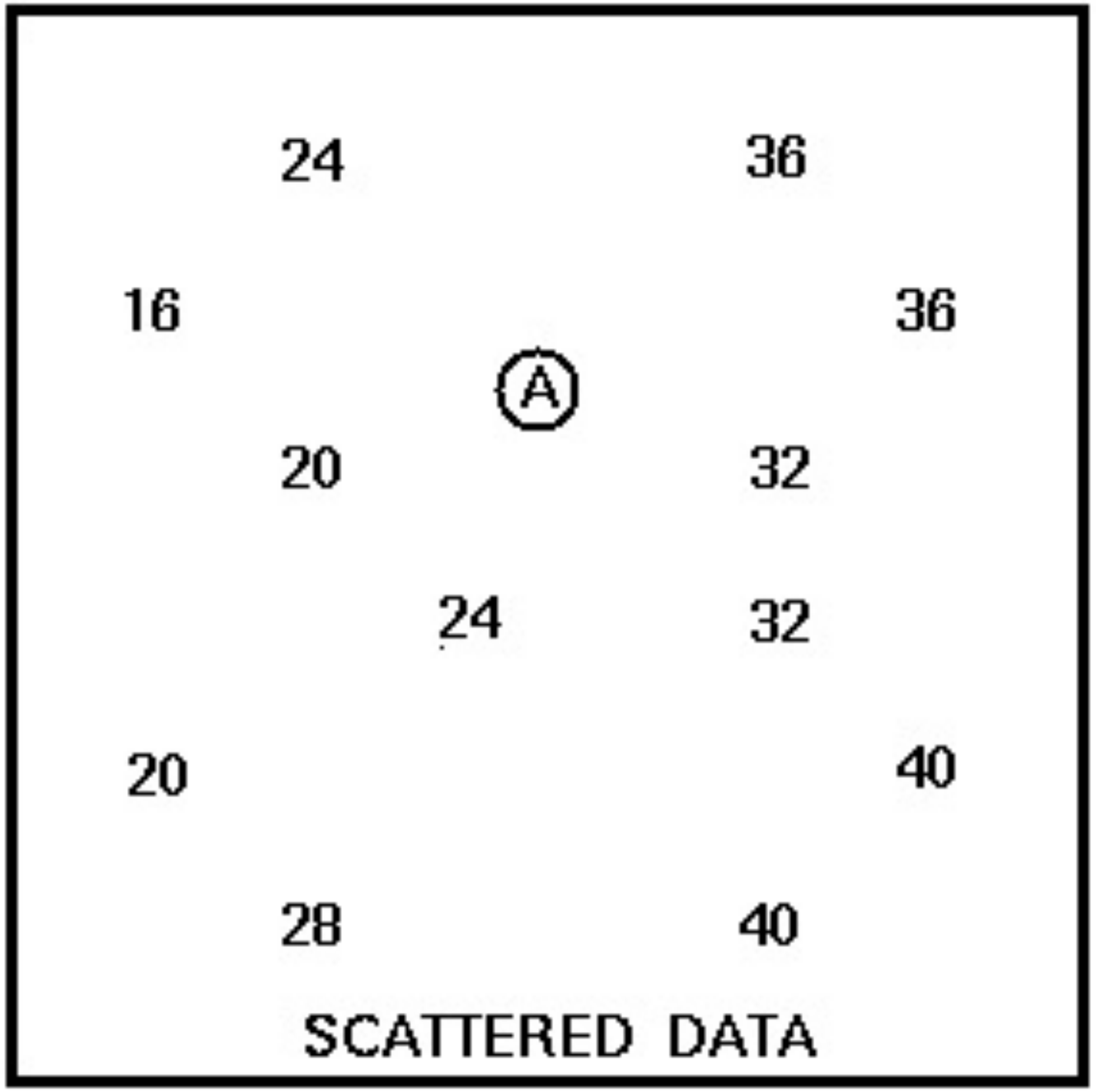
- Never intersect (CROSS)
- Do not begin or end within the map
- Run-off map or make loops or circles
- Constant interval throughout the map
- Isoline must go through a point that is consistent with the interval

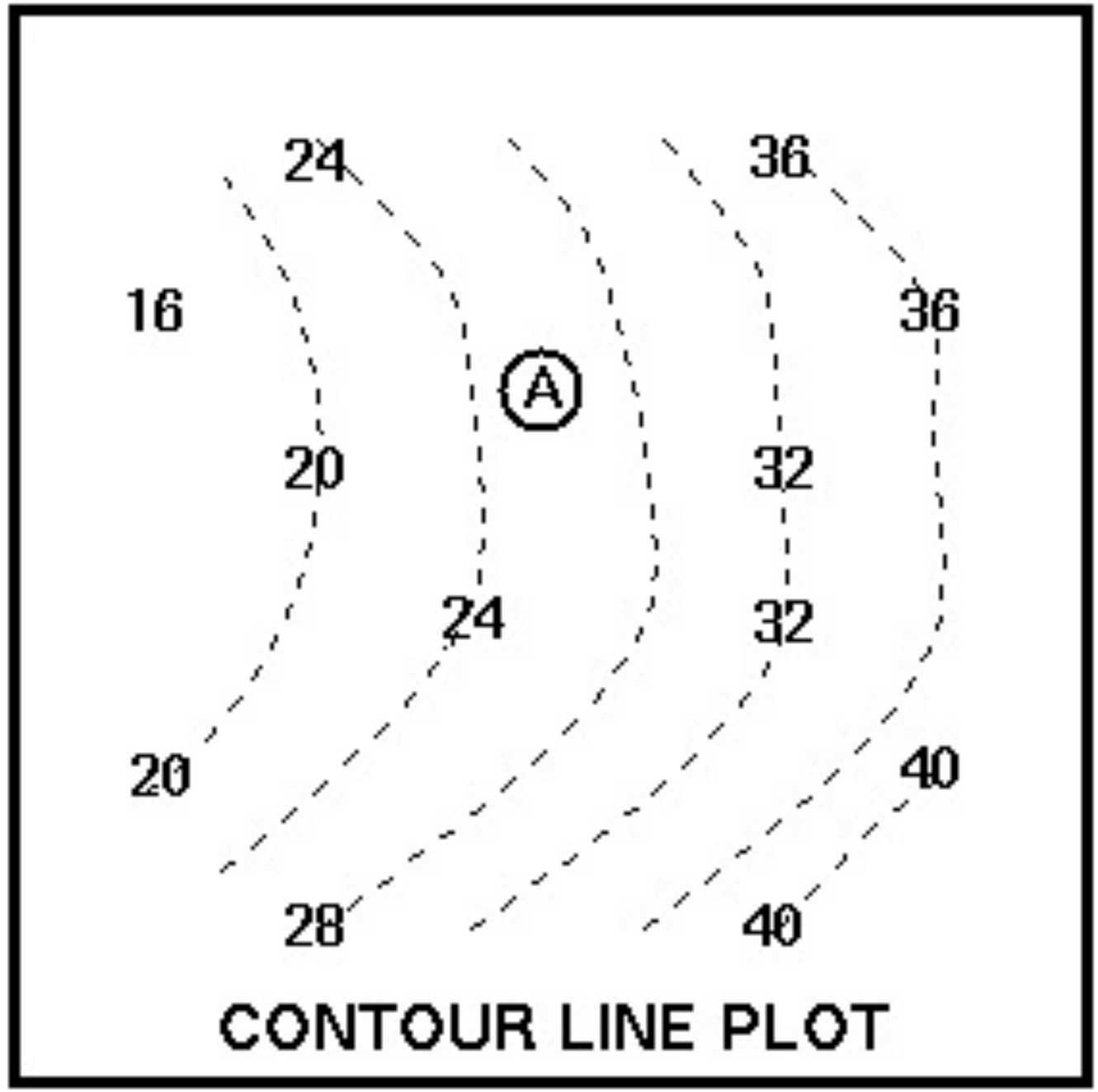

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Contour Interval - 10 feet


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SCATTERED DATA



CONTOUR LINE PLOT

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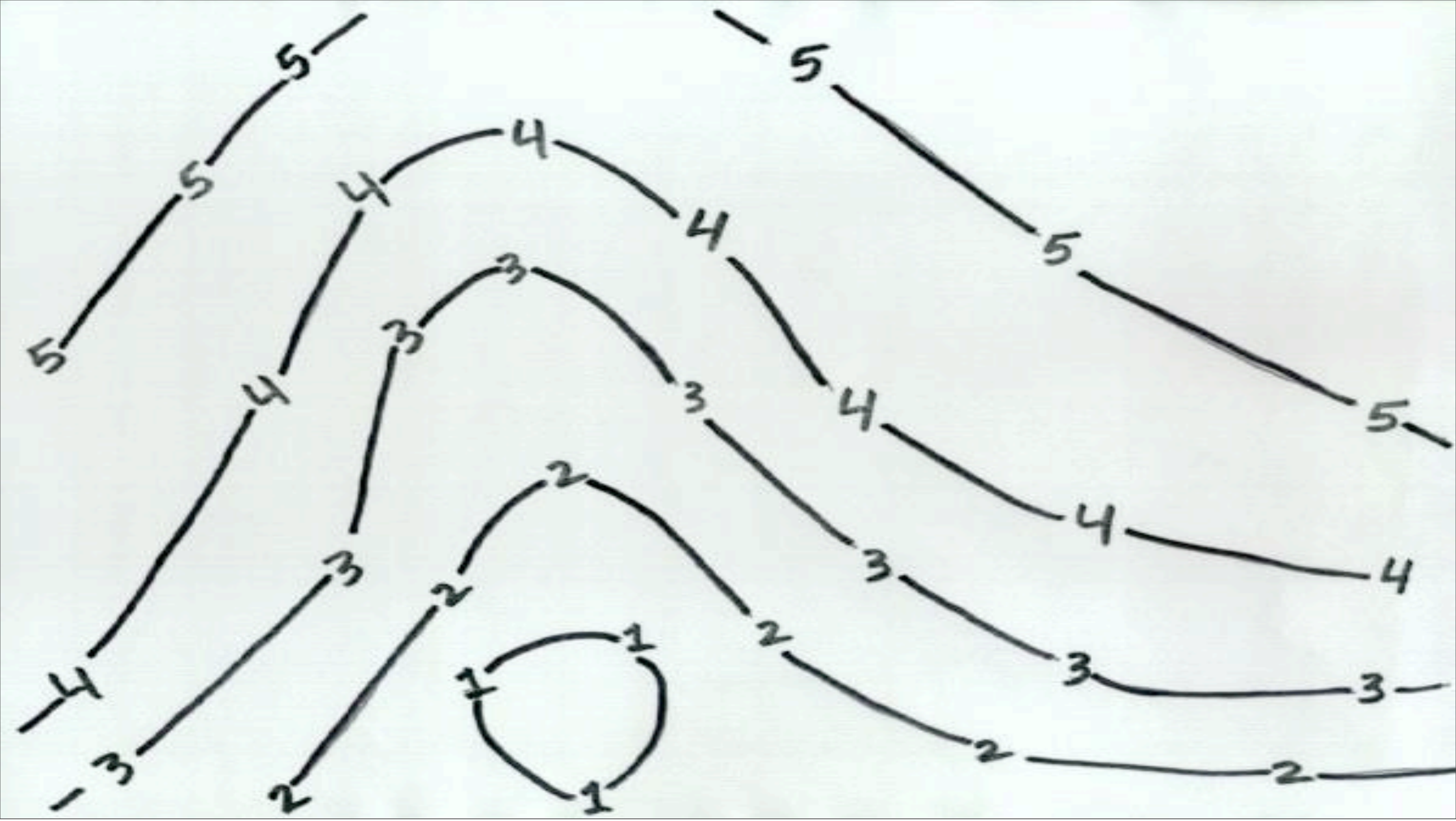
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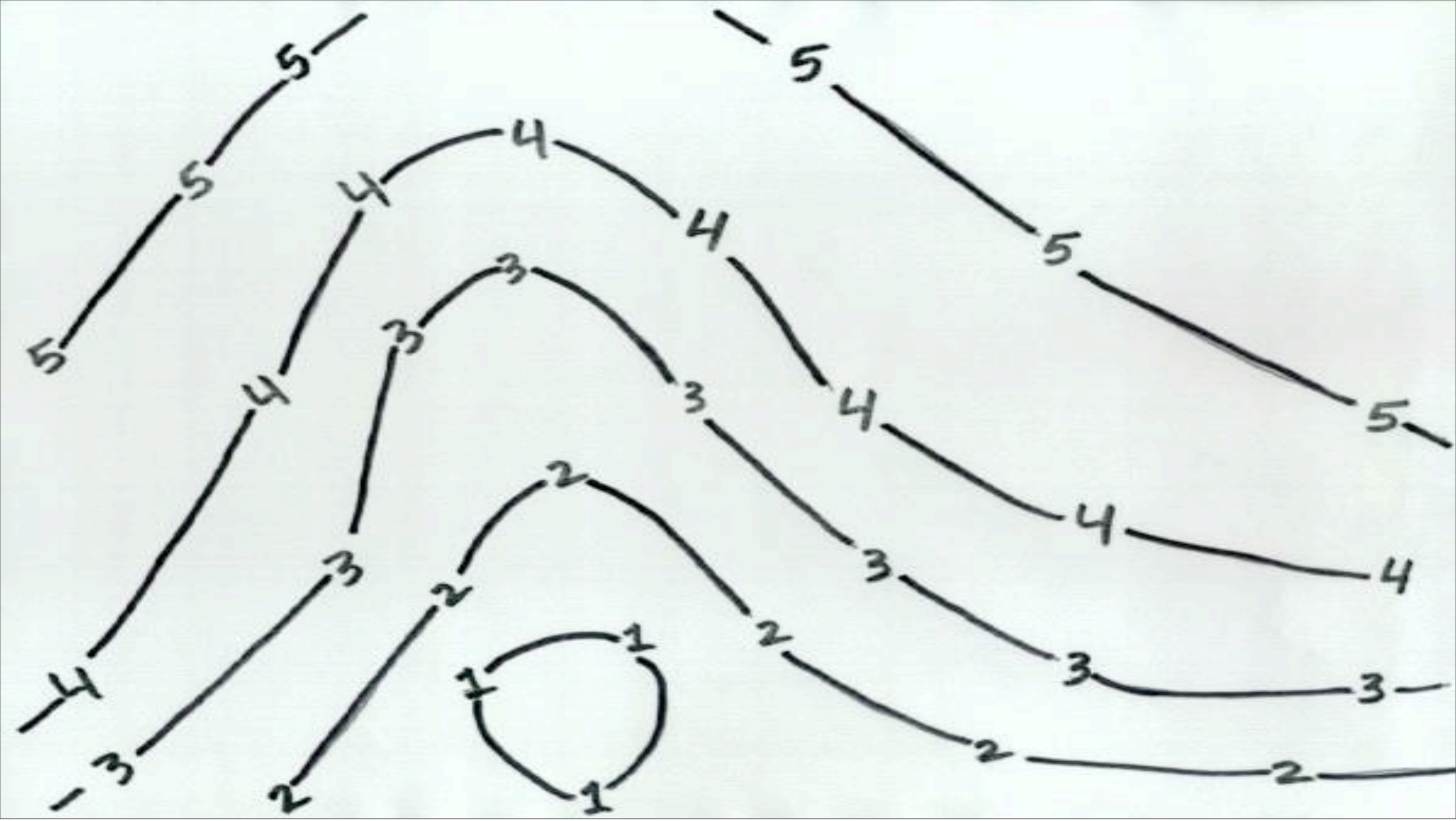
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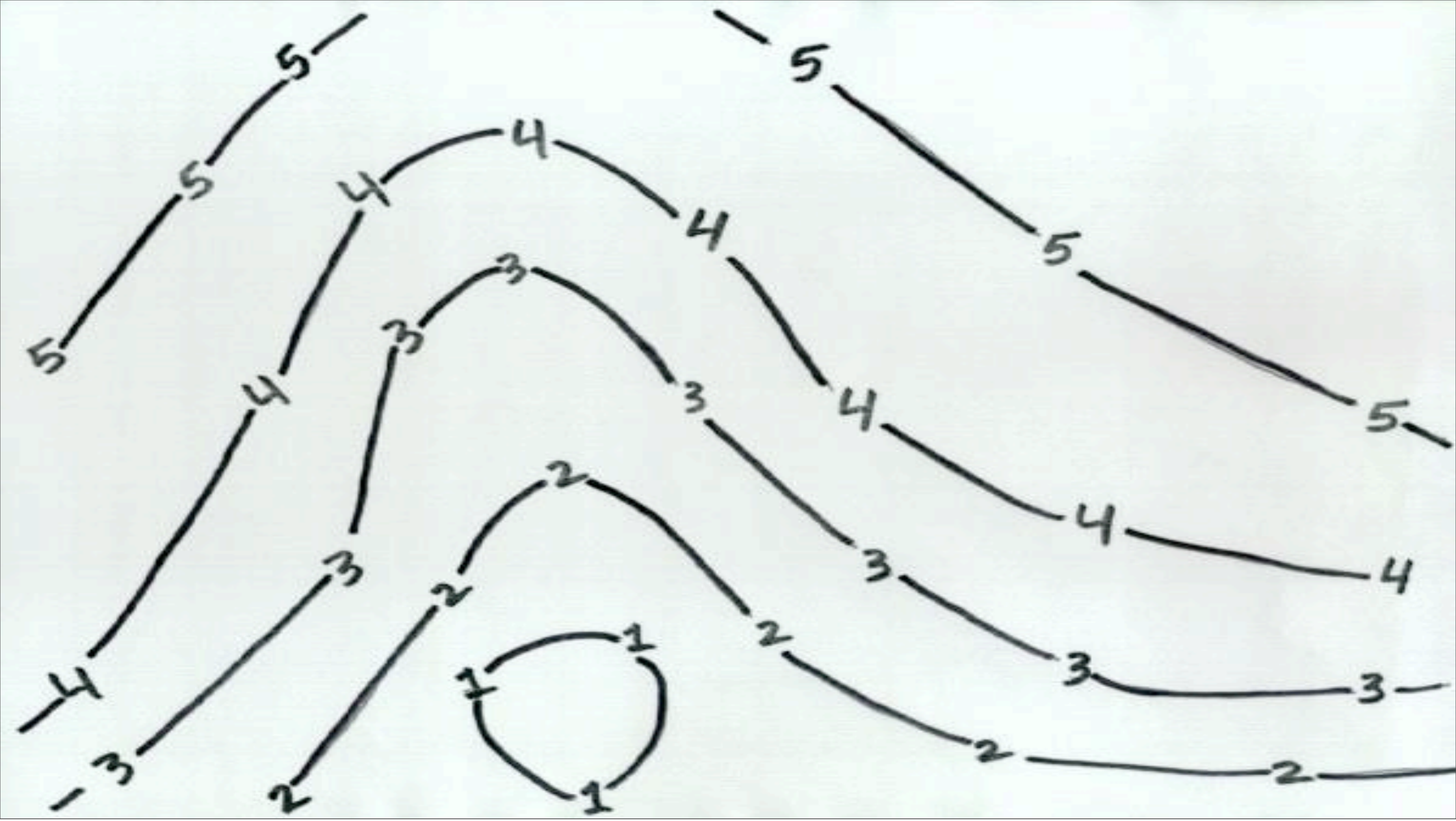
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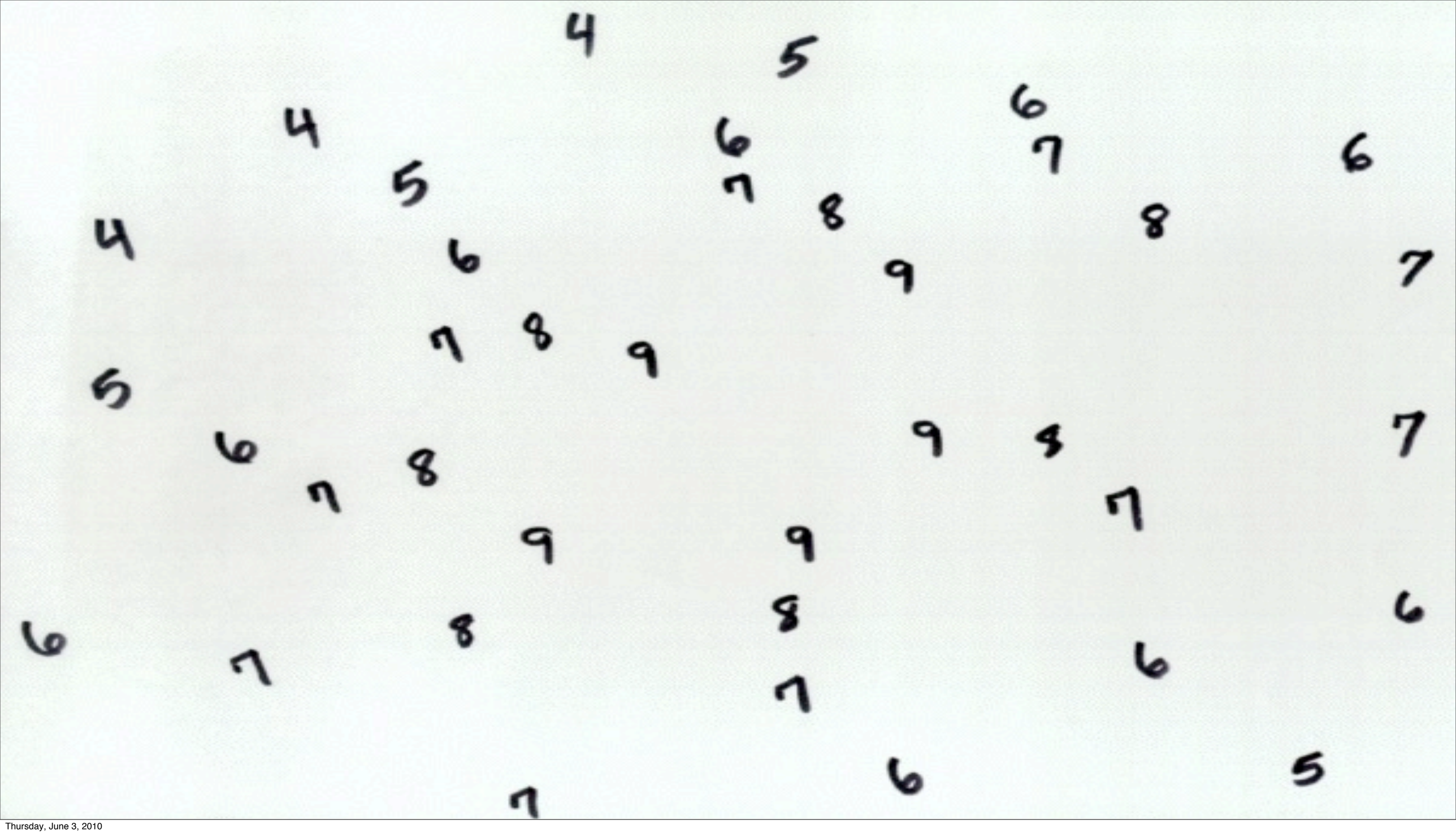
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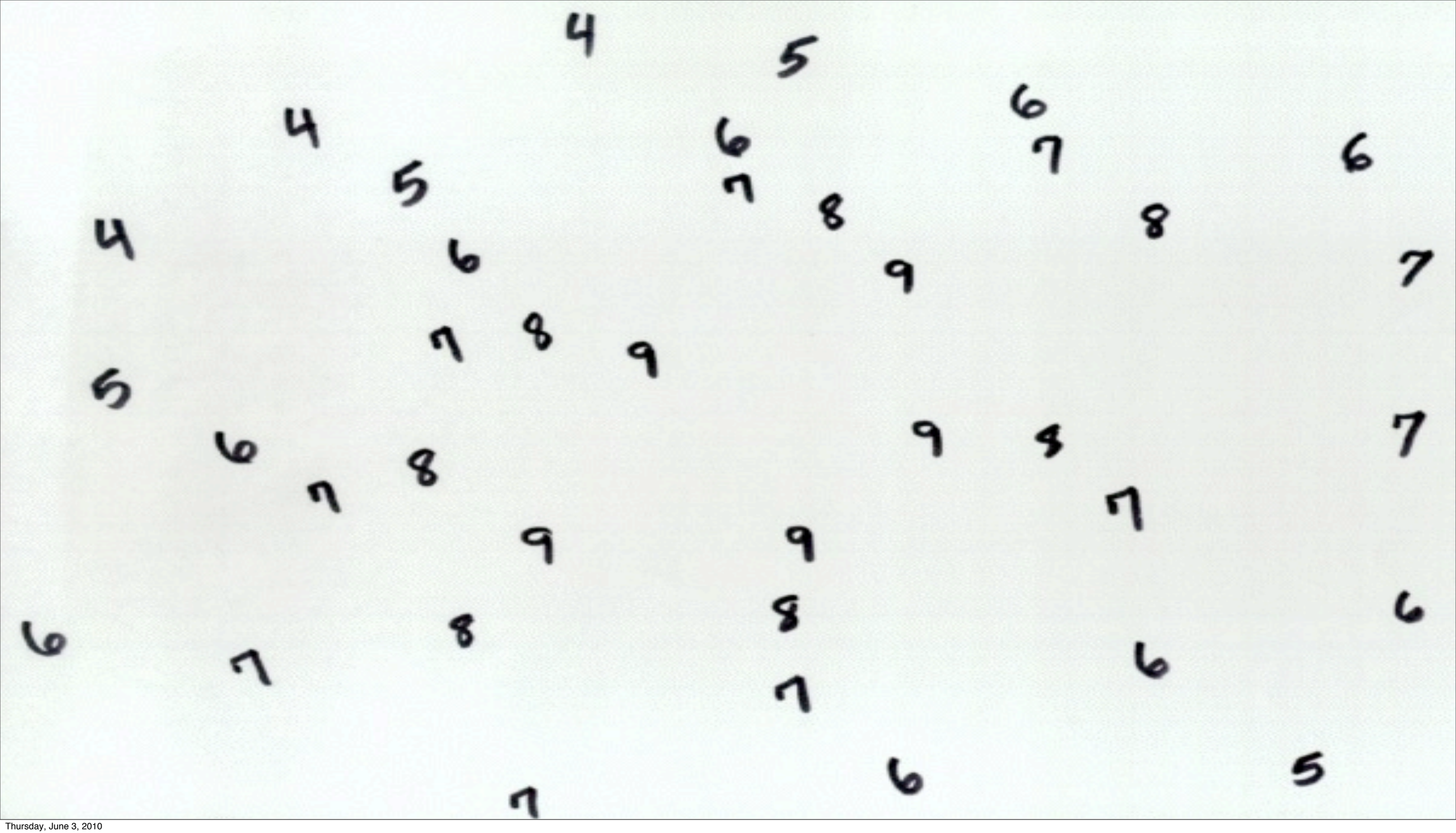
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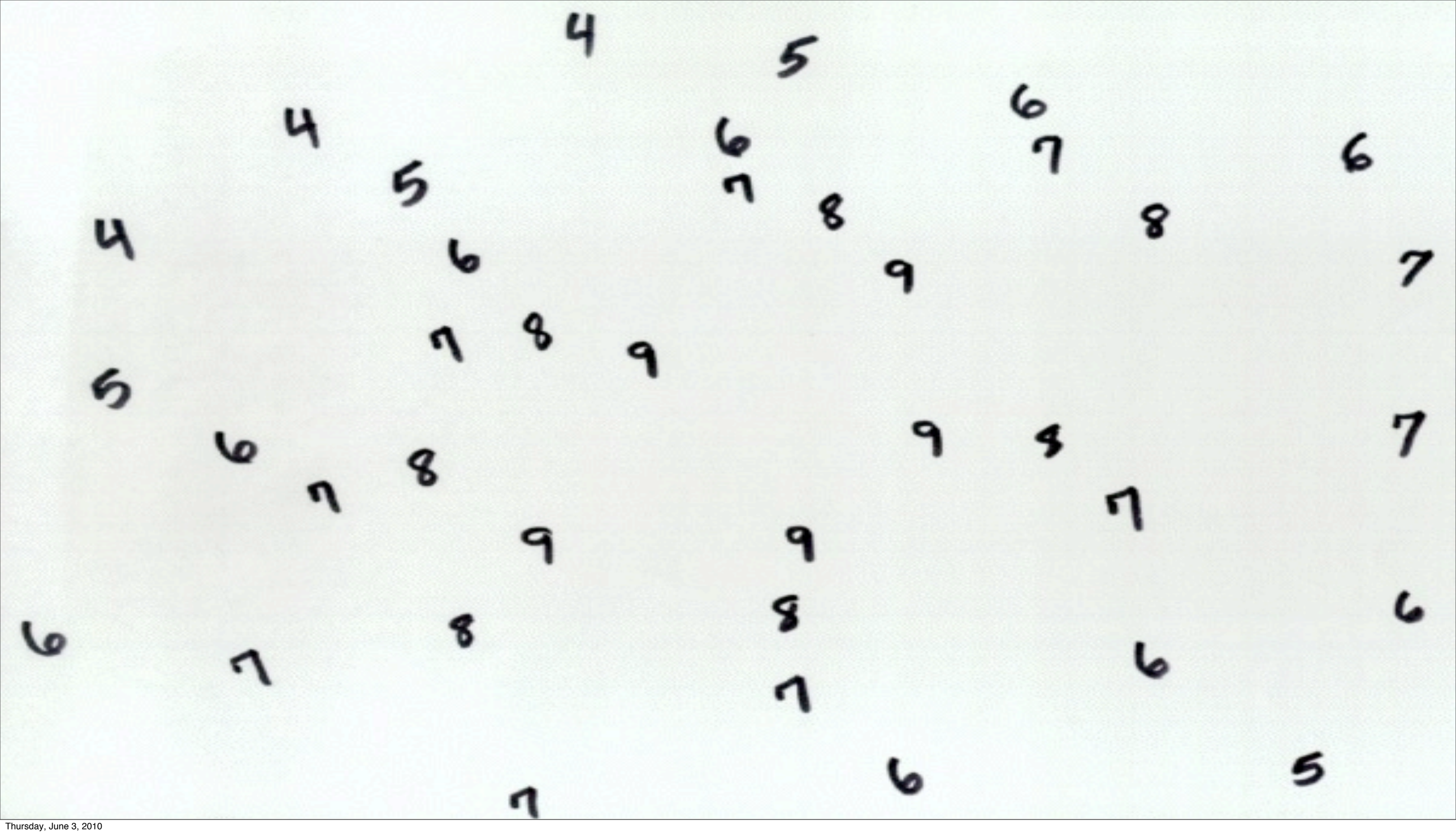

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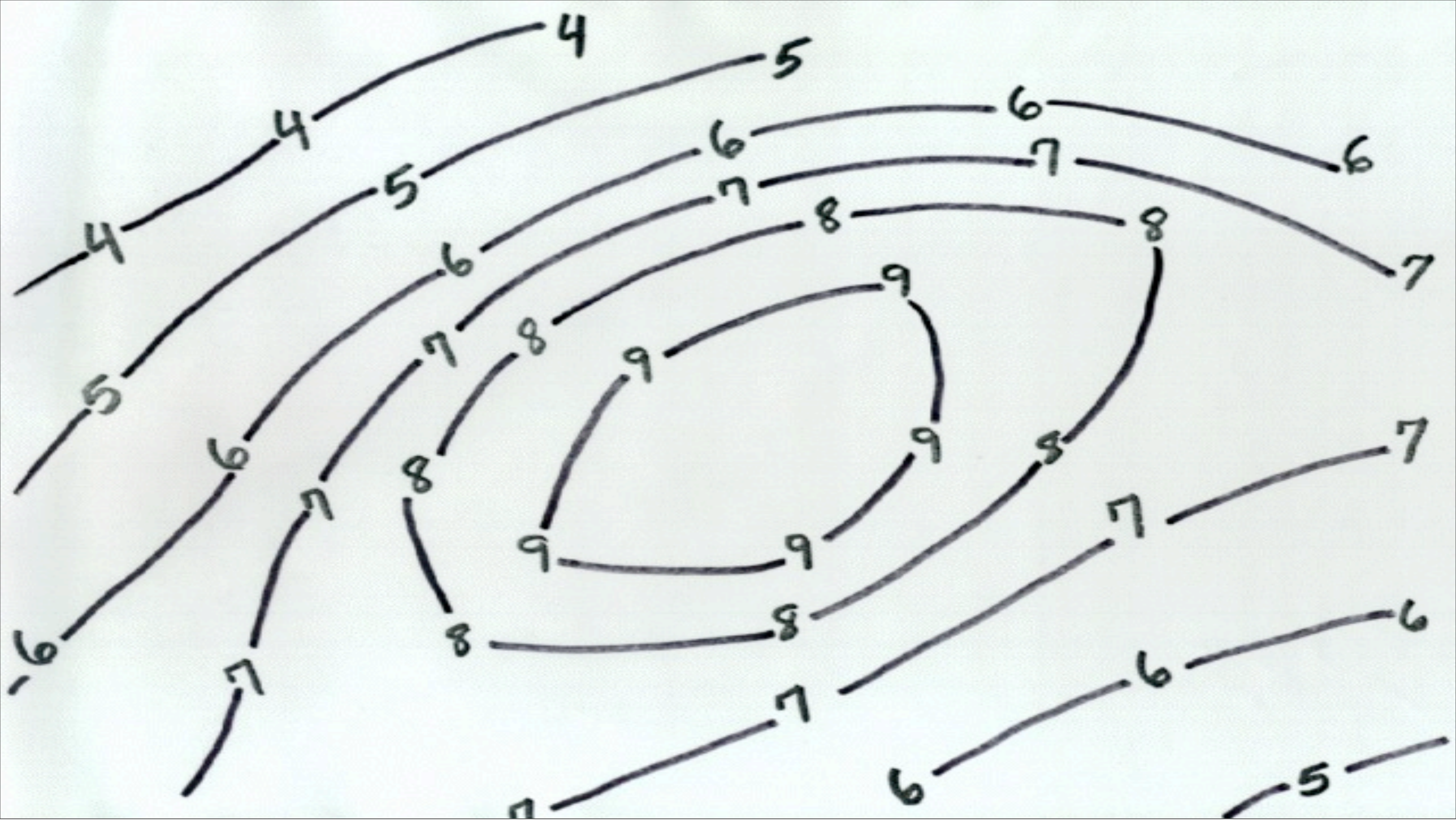

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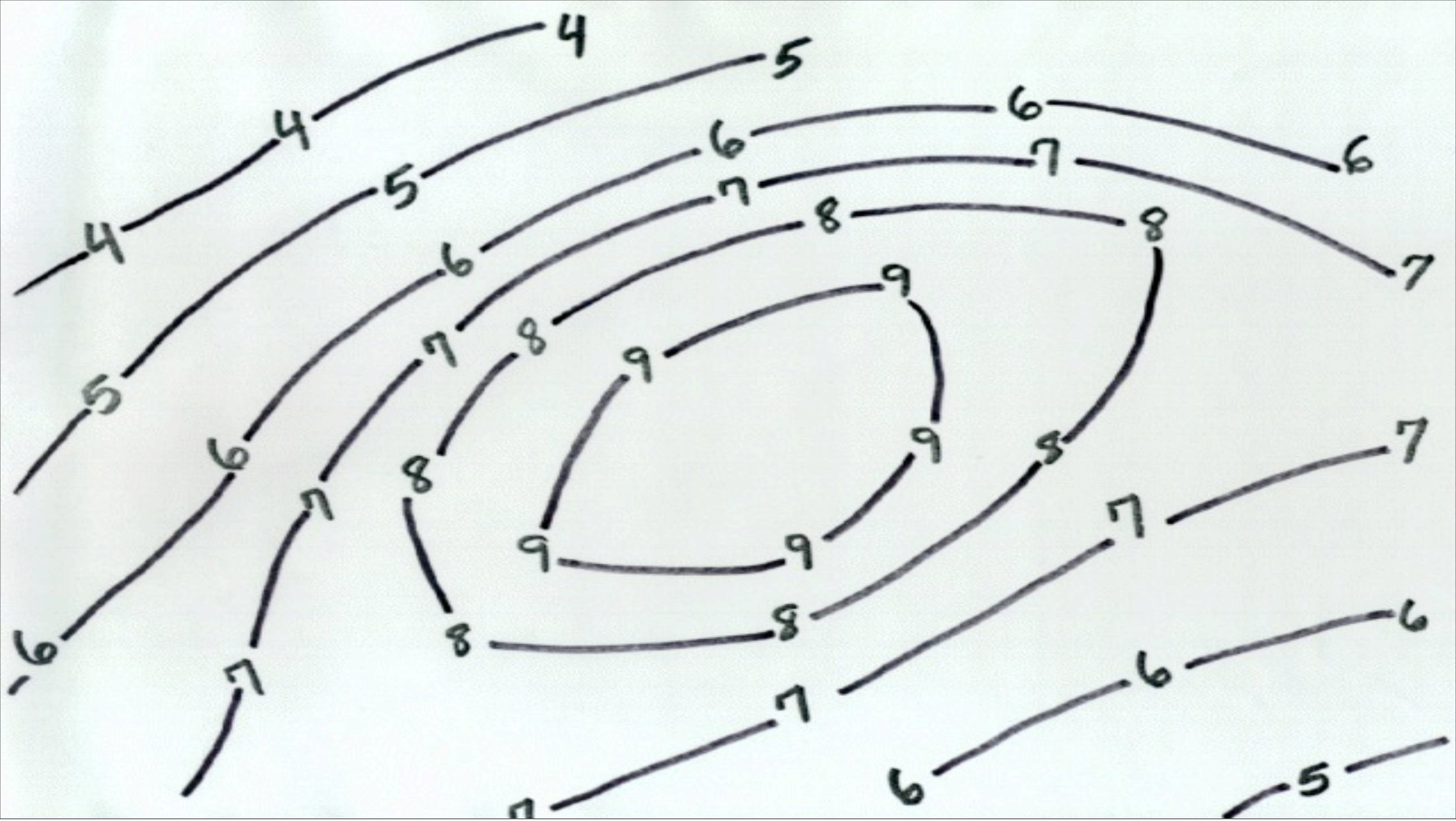

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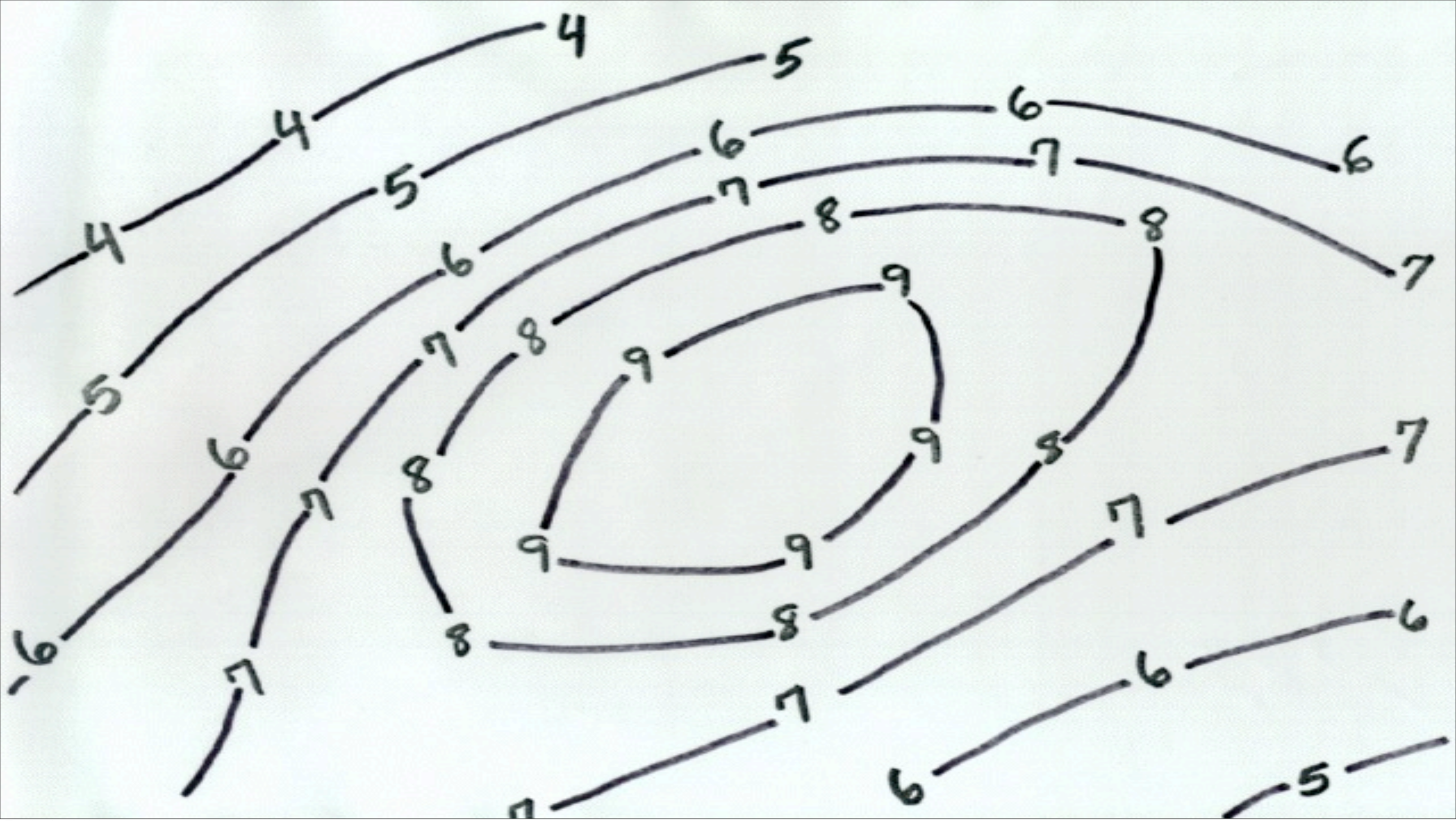







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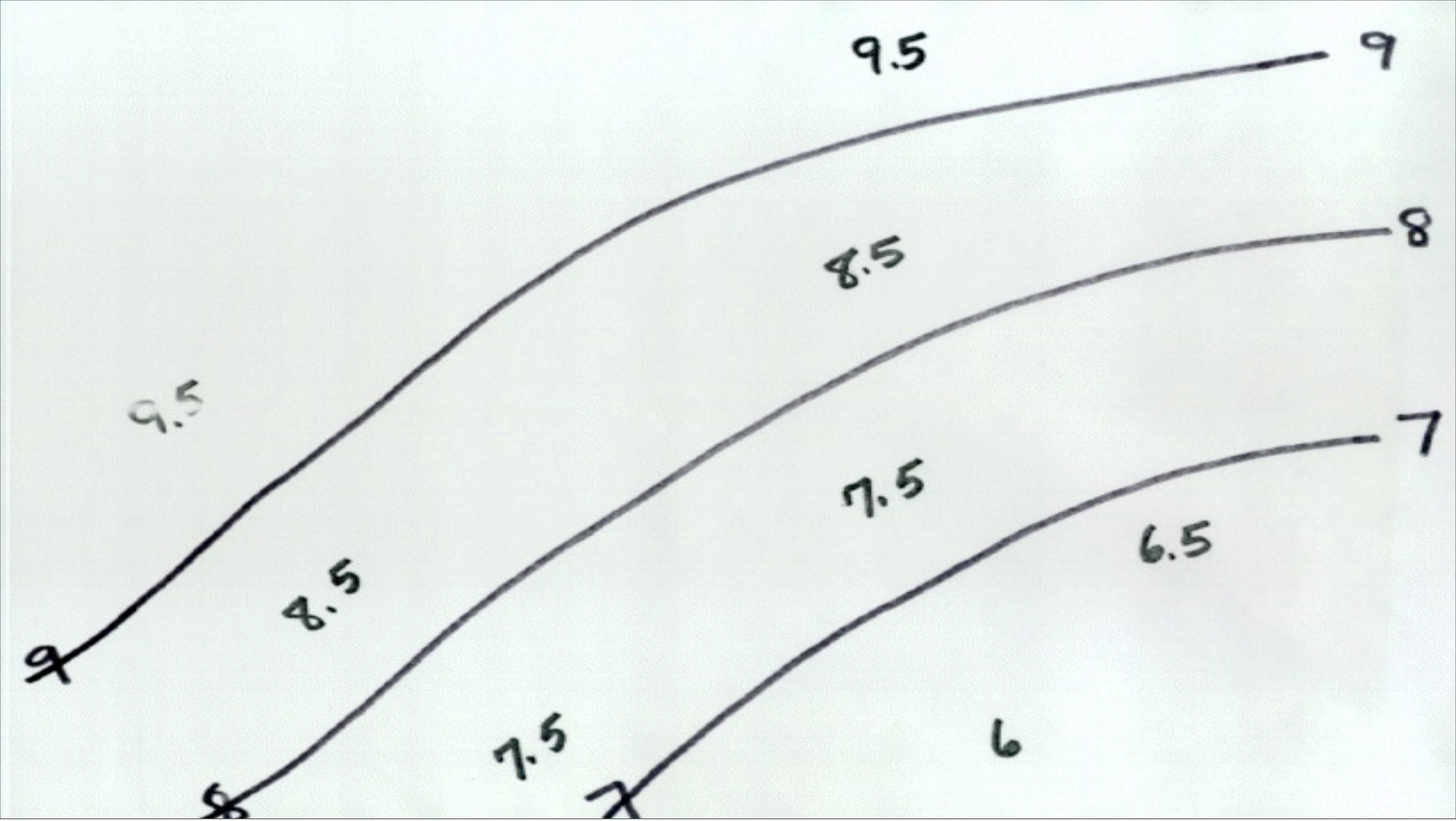
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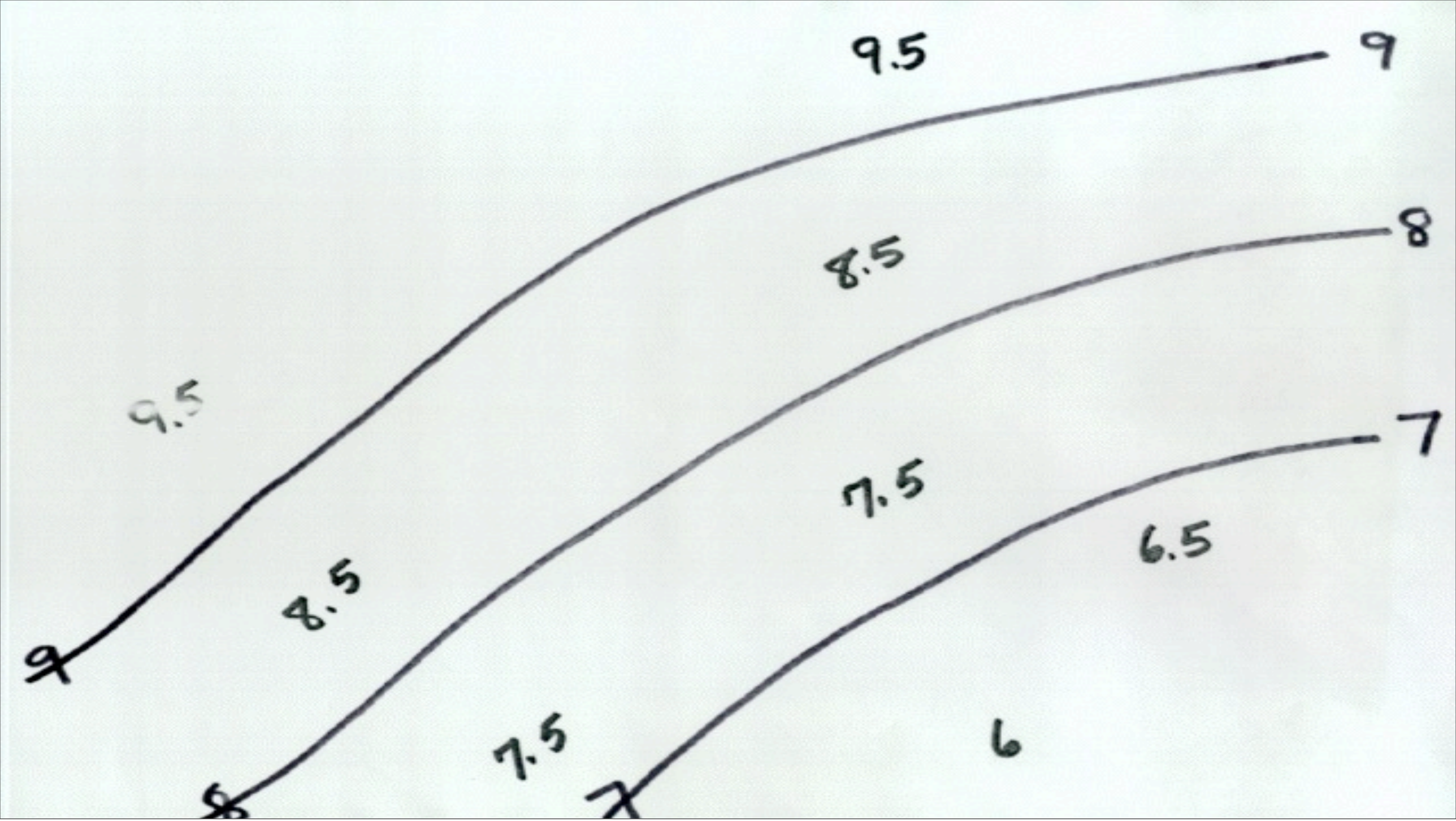
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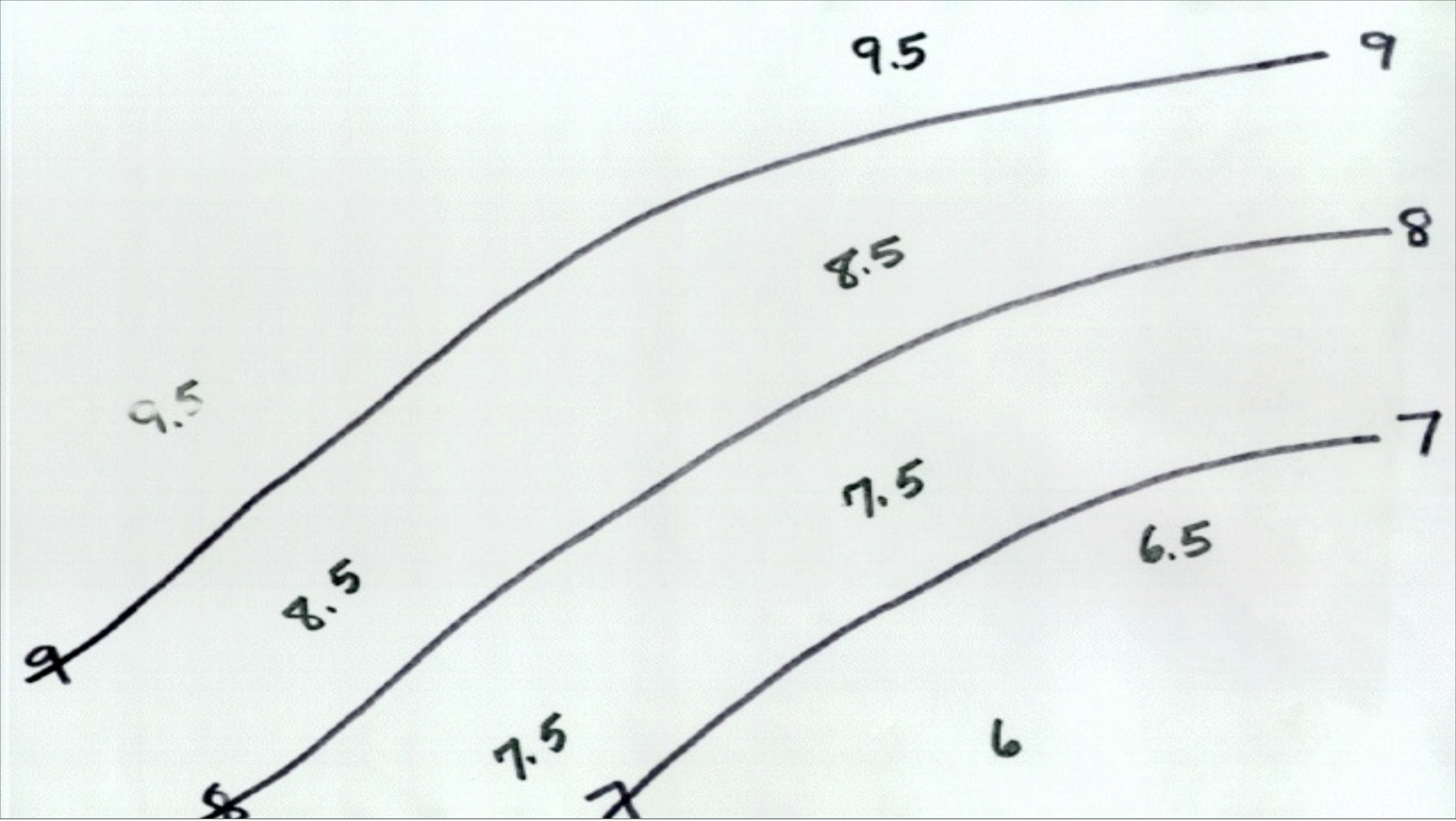
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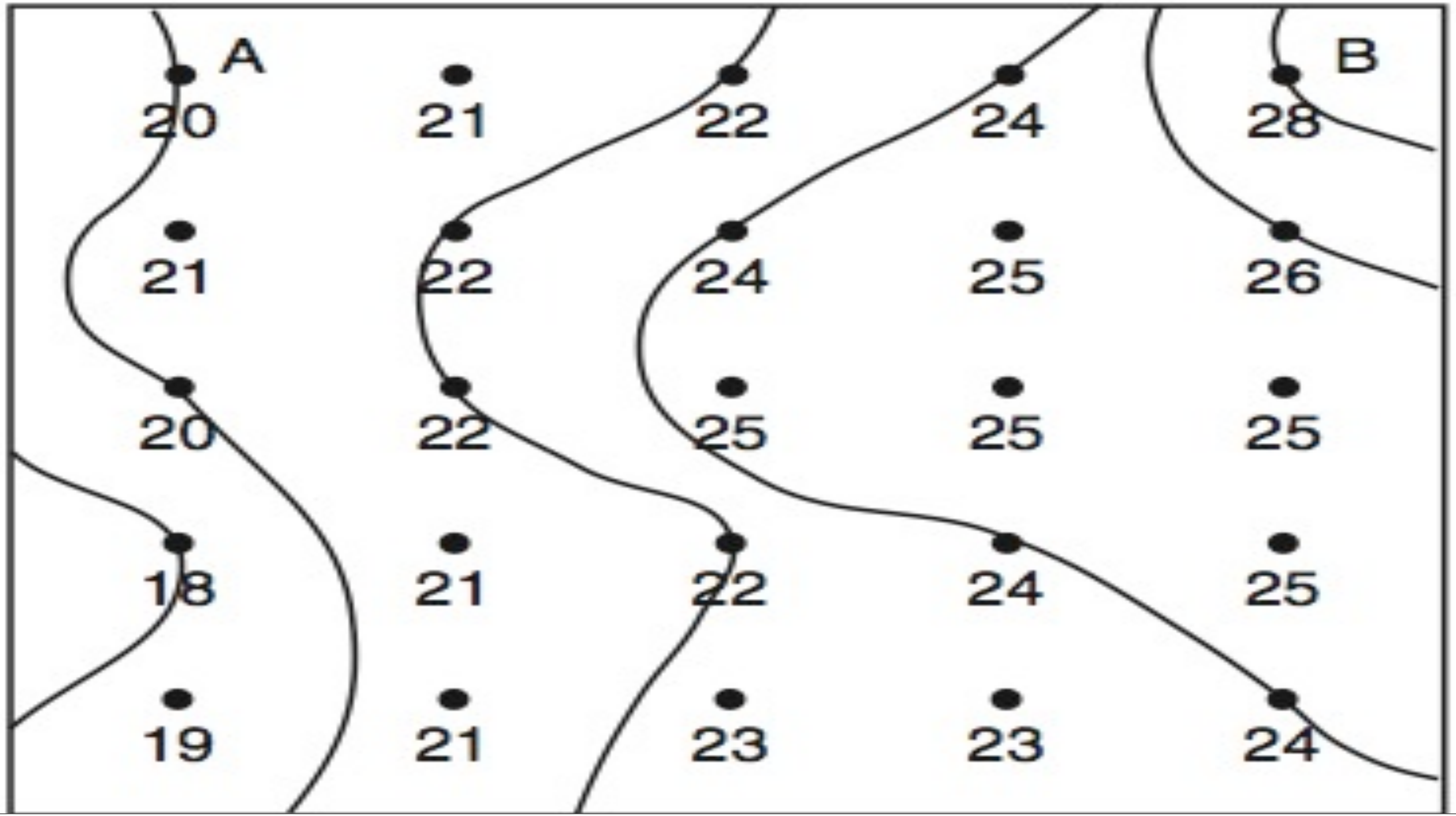
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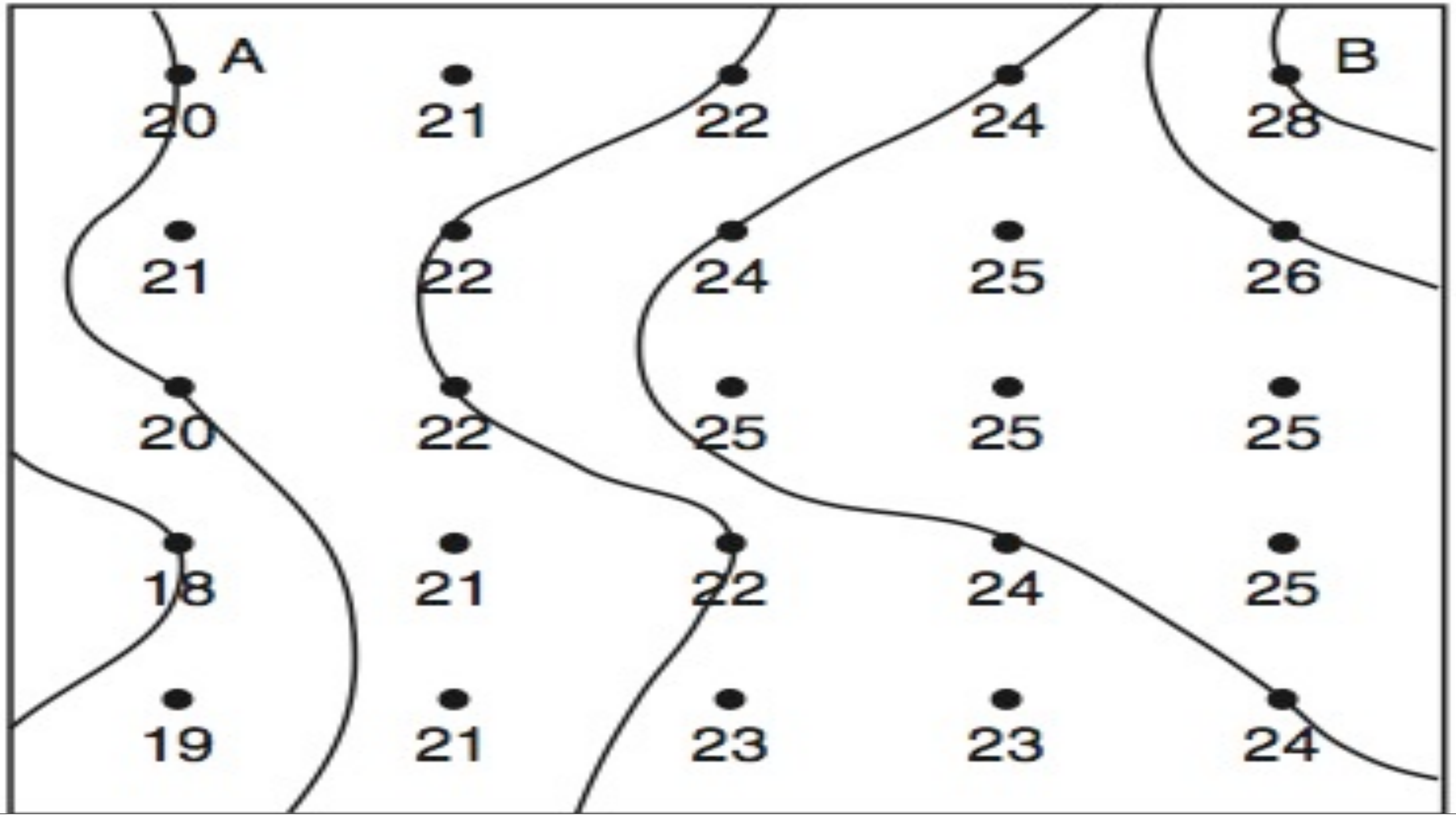
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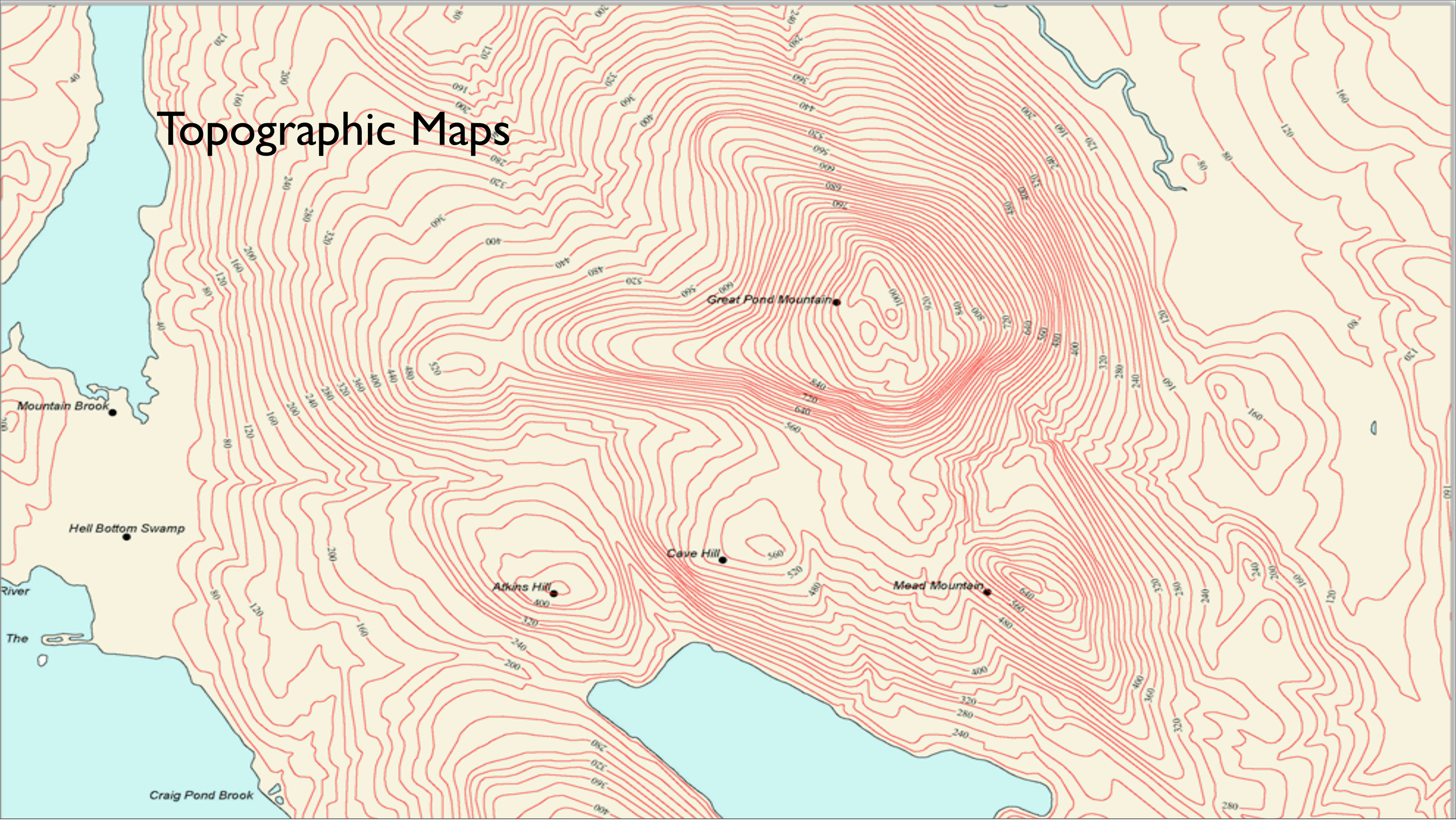

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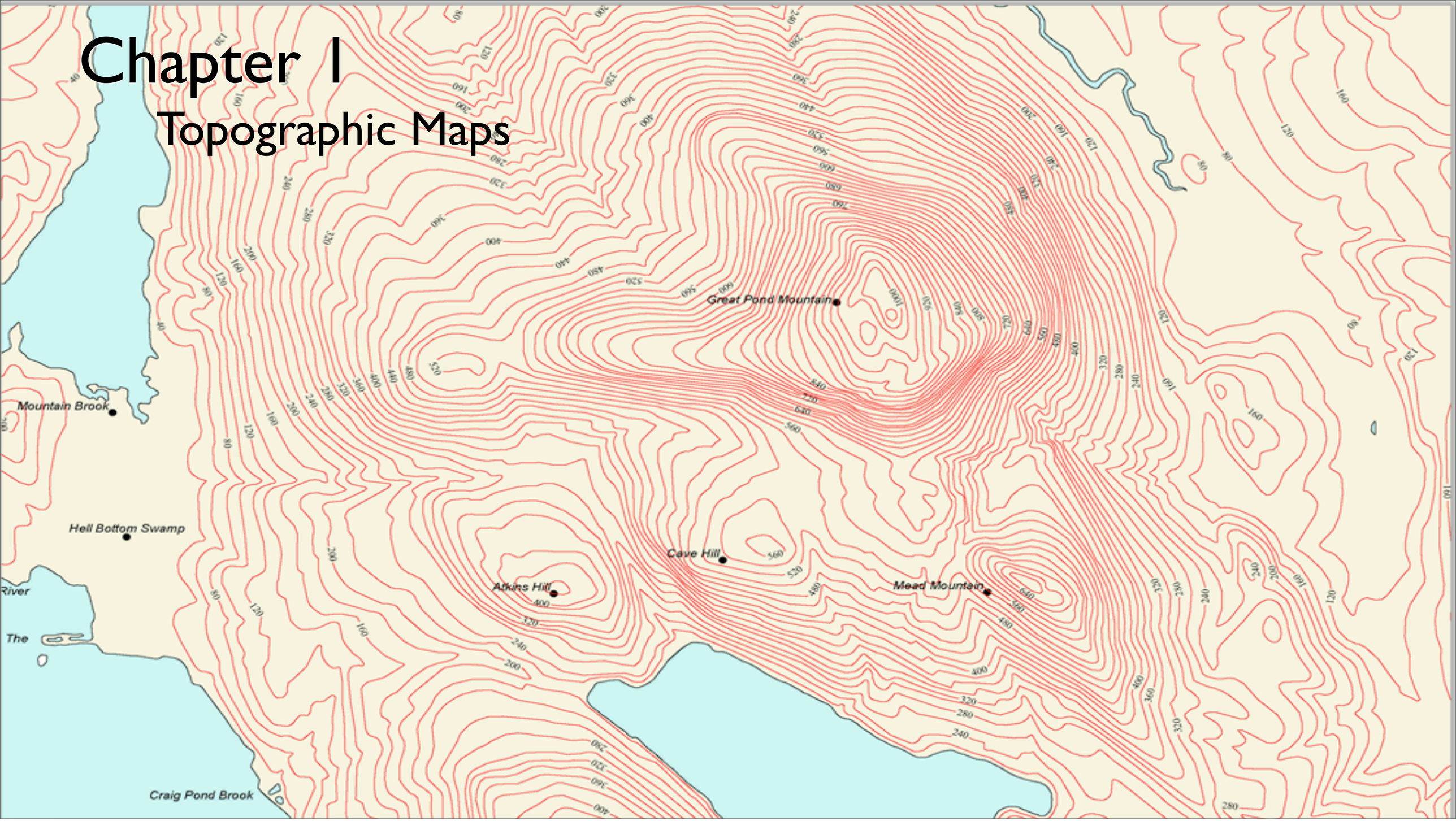

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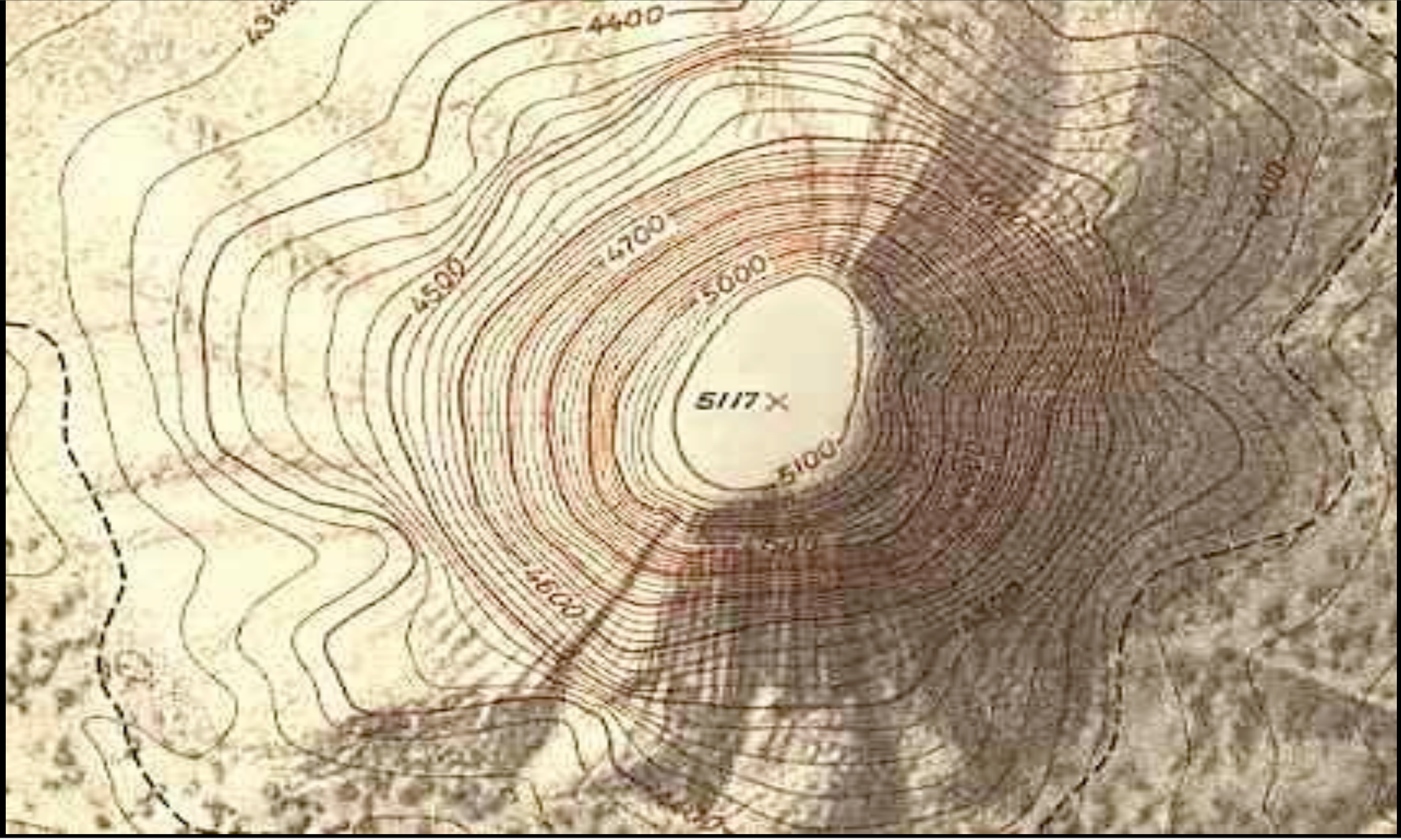
Topographic Maps

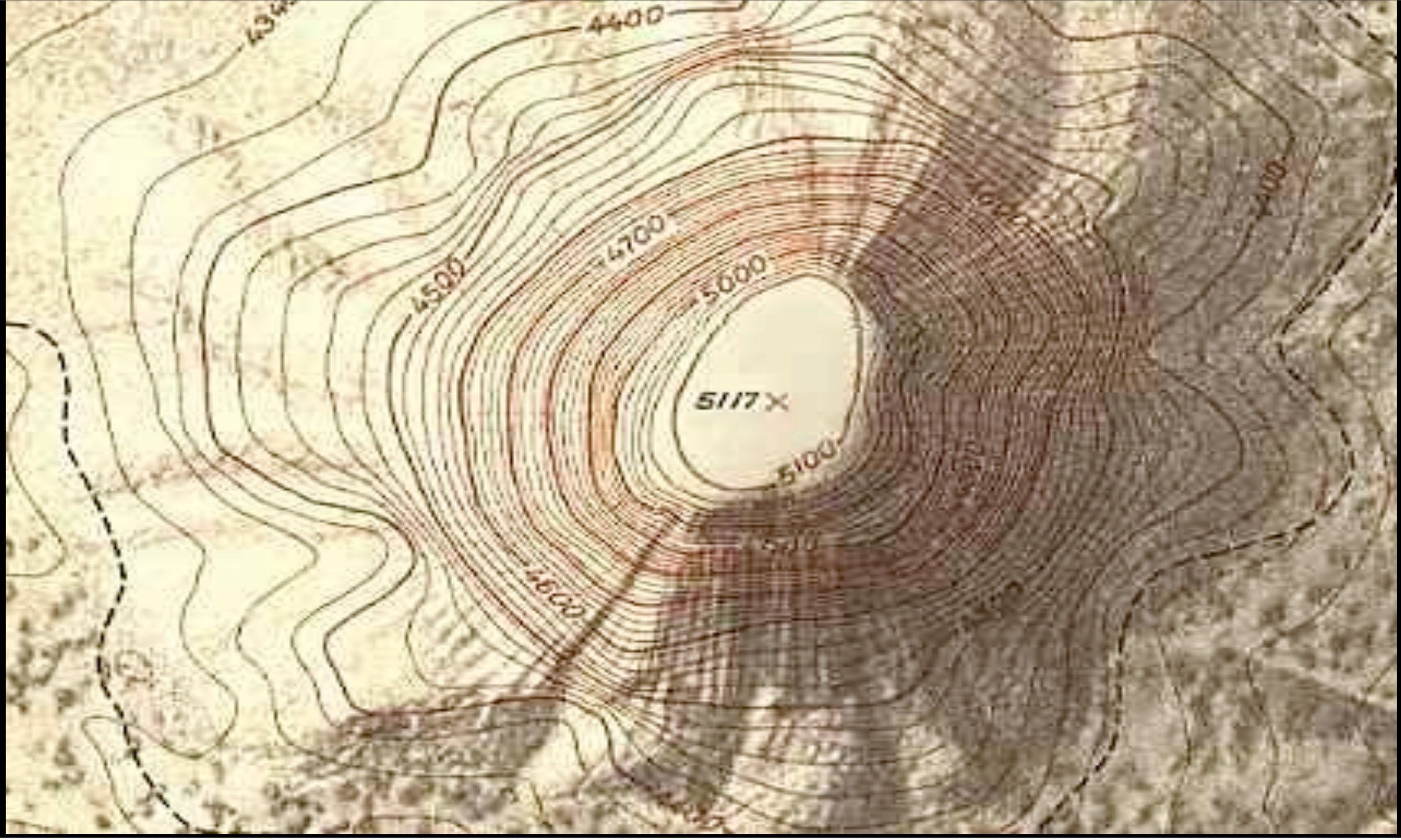


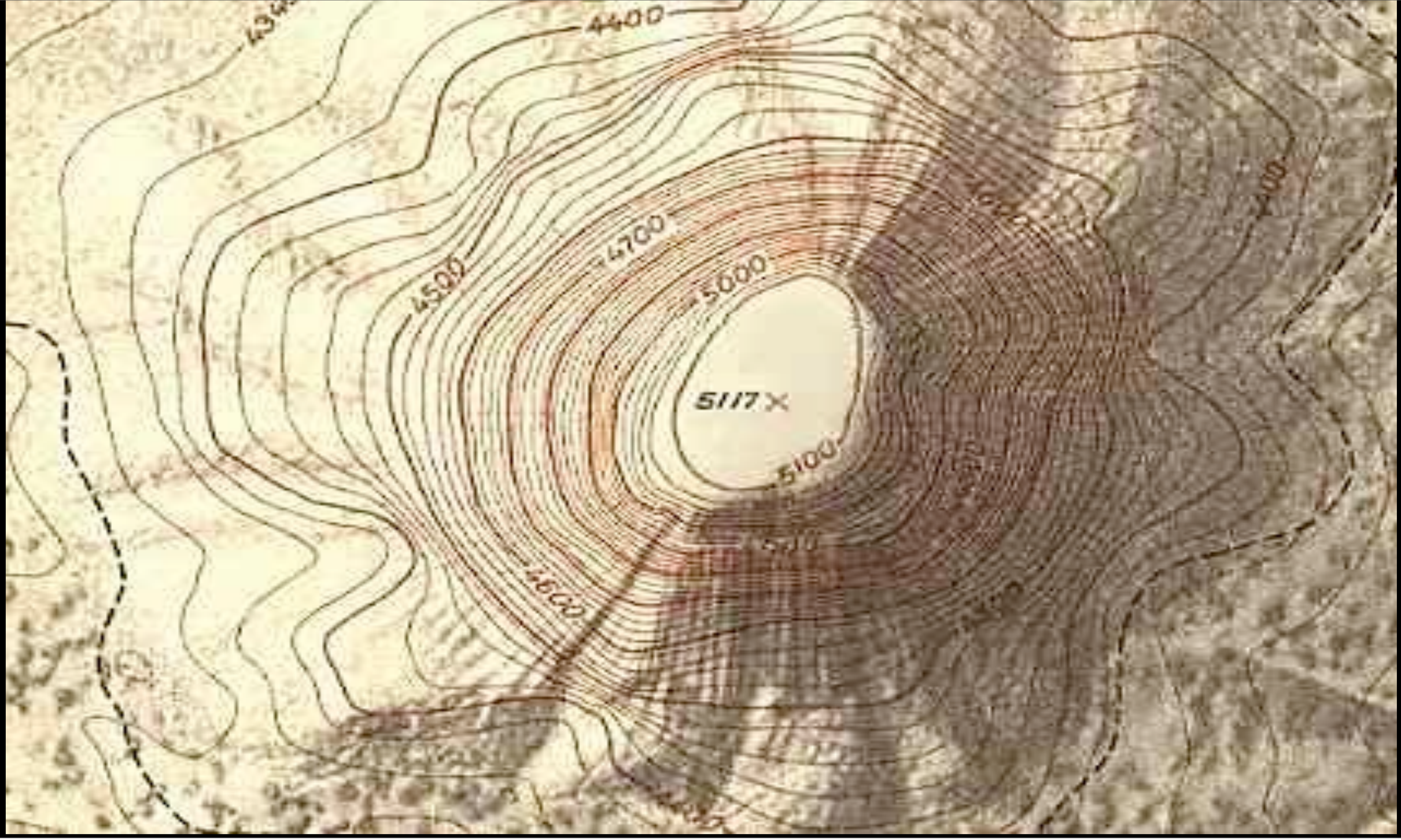
Chapter 1

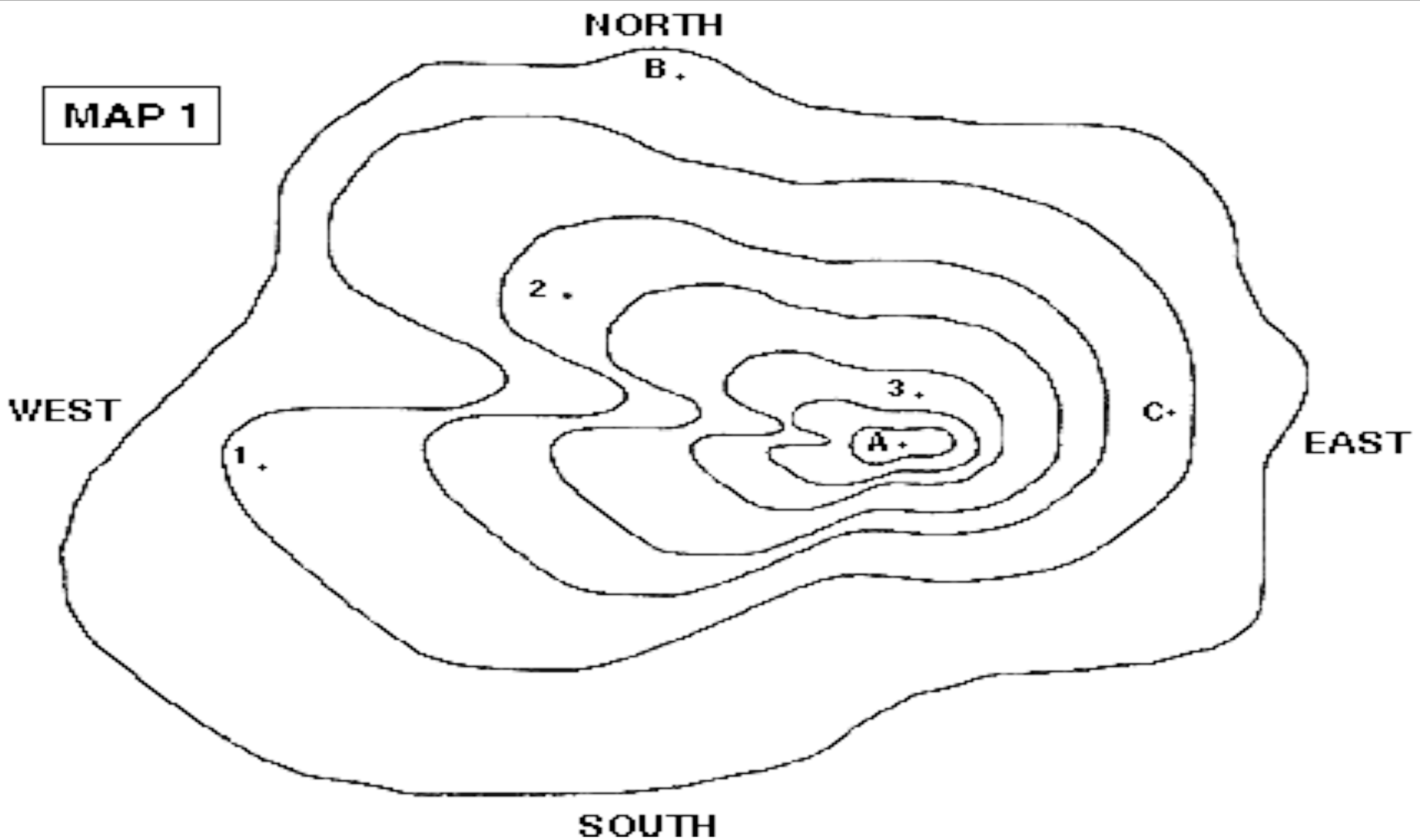
Topographic Maps

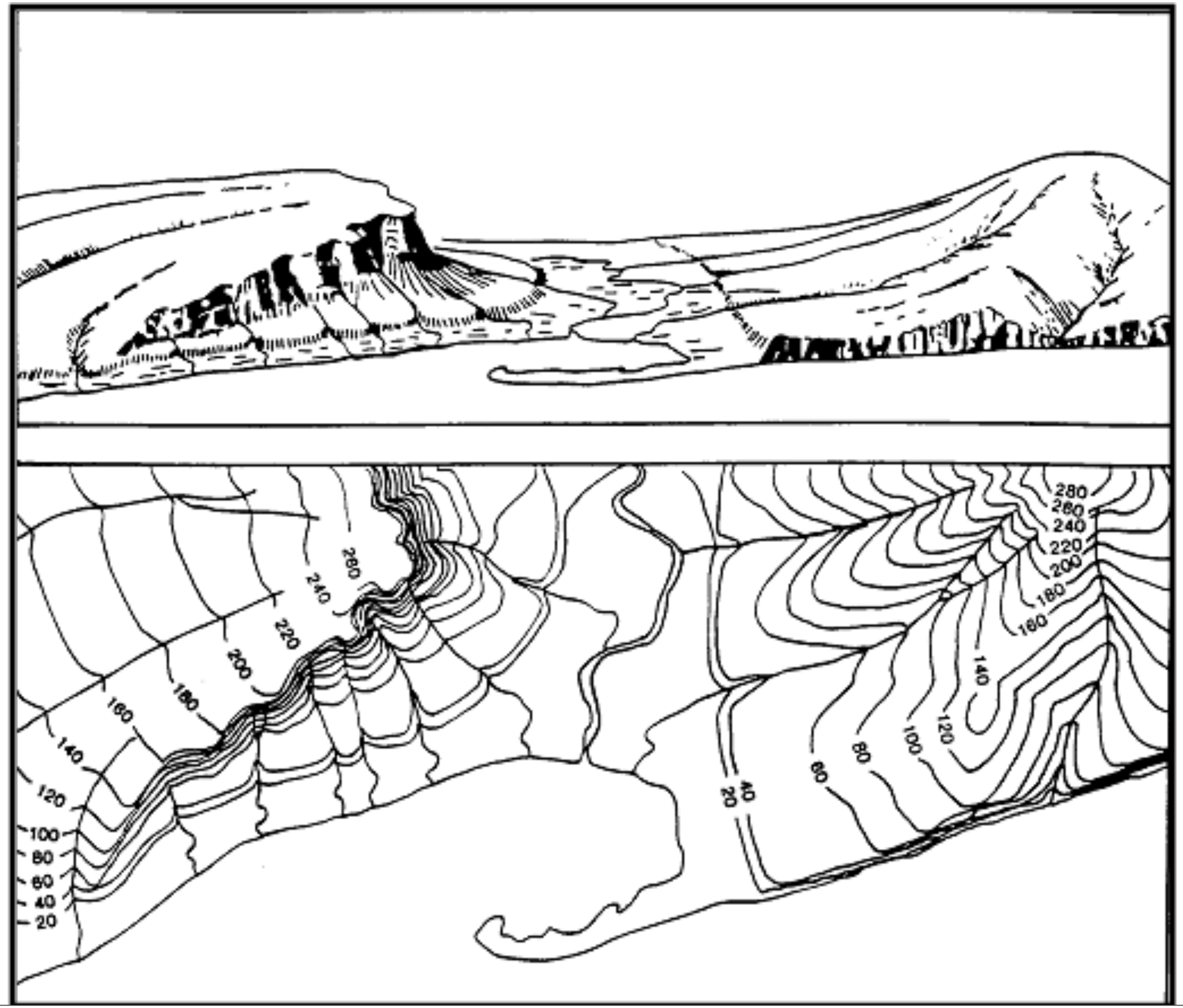


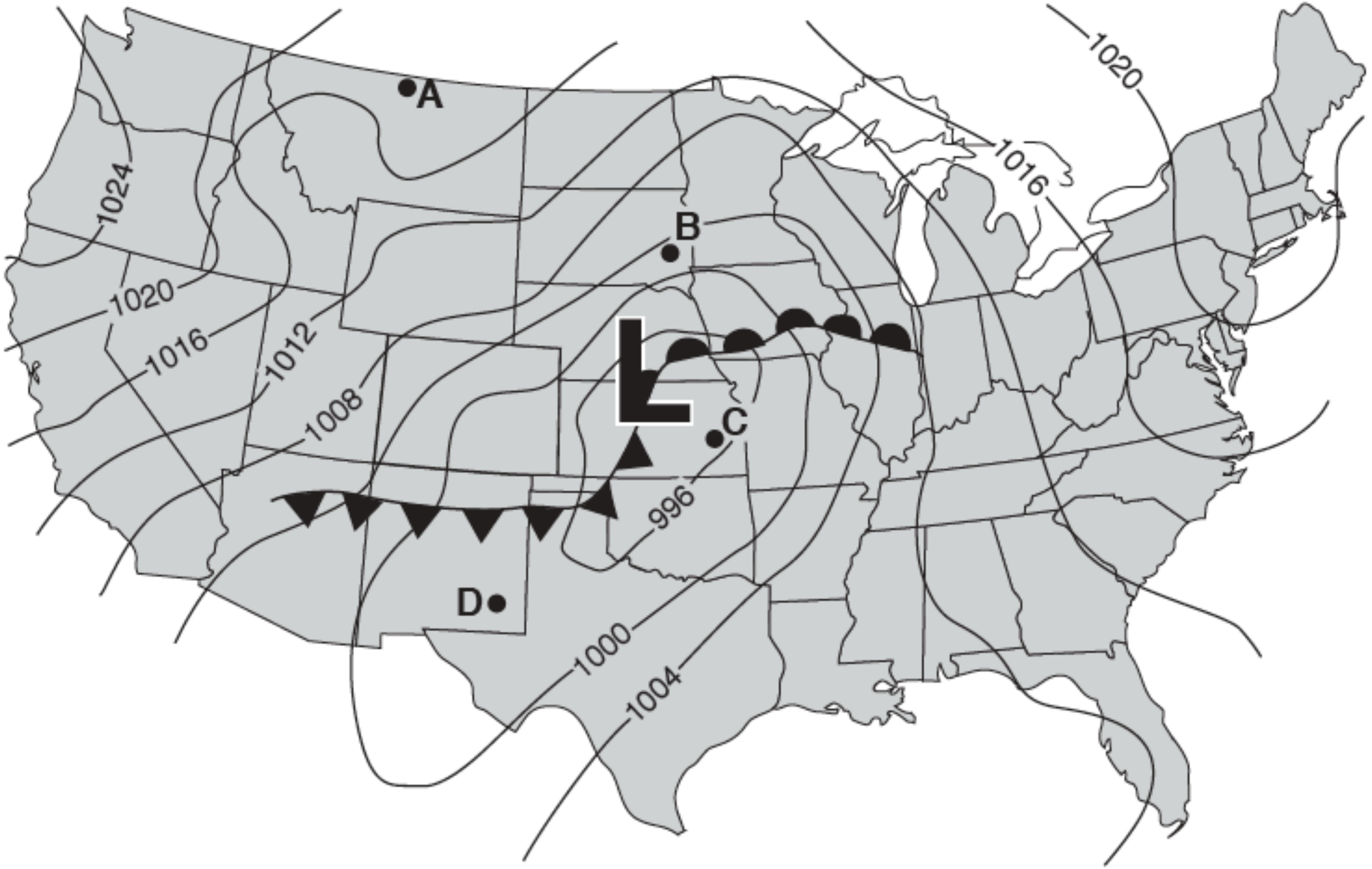

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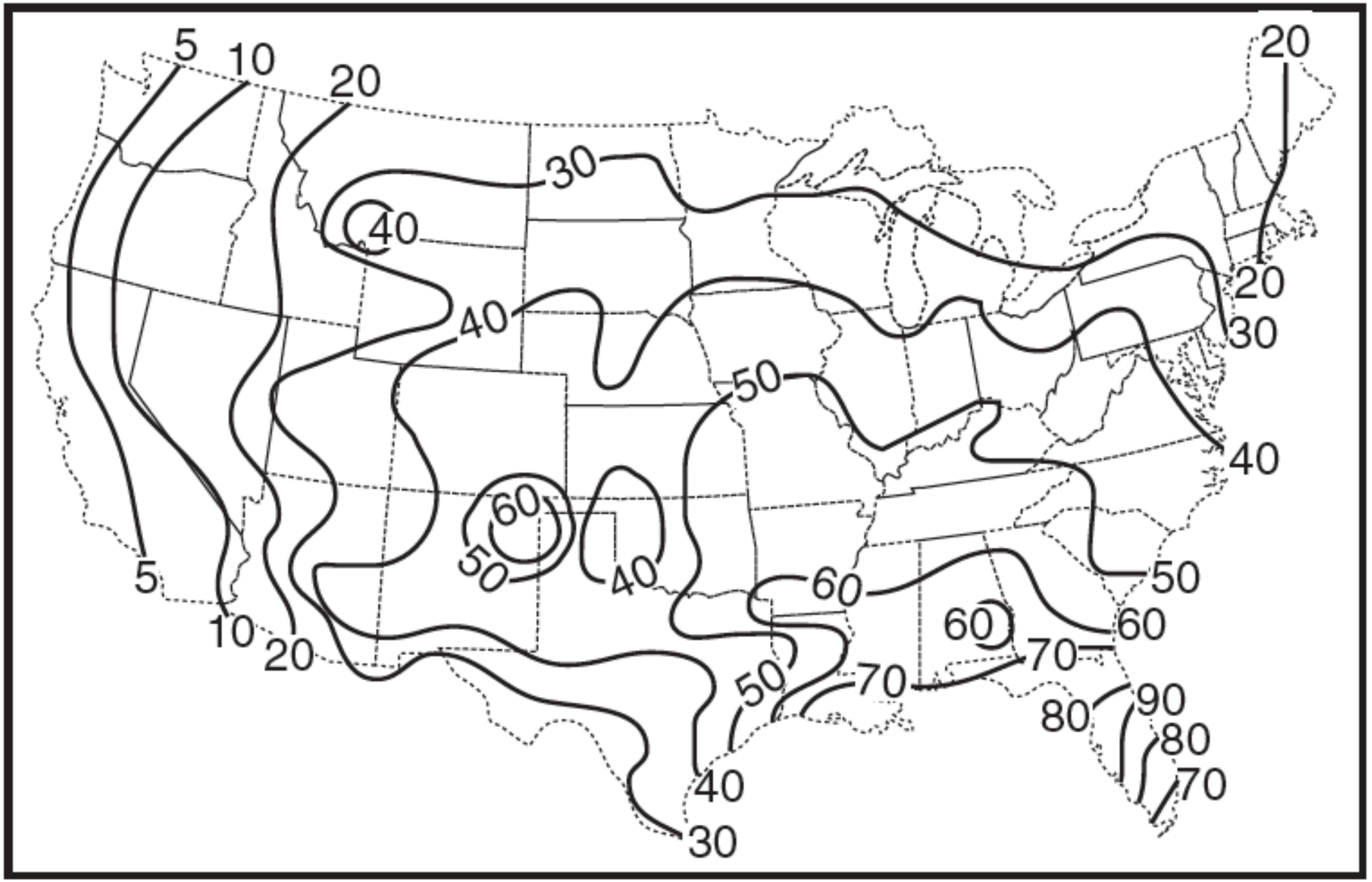

MAP 1
NORTH
WEST
EAST
SOUTH
A.
B.
C.
1.
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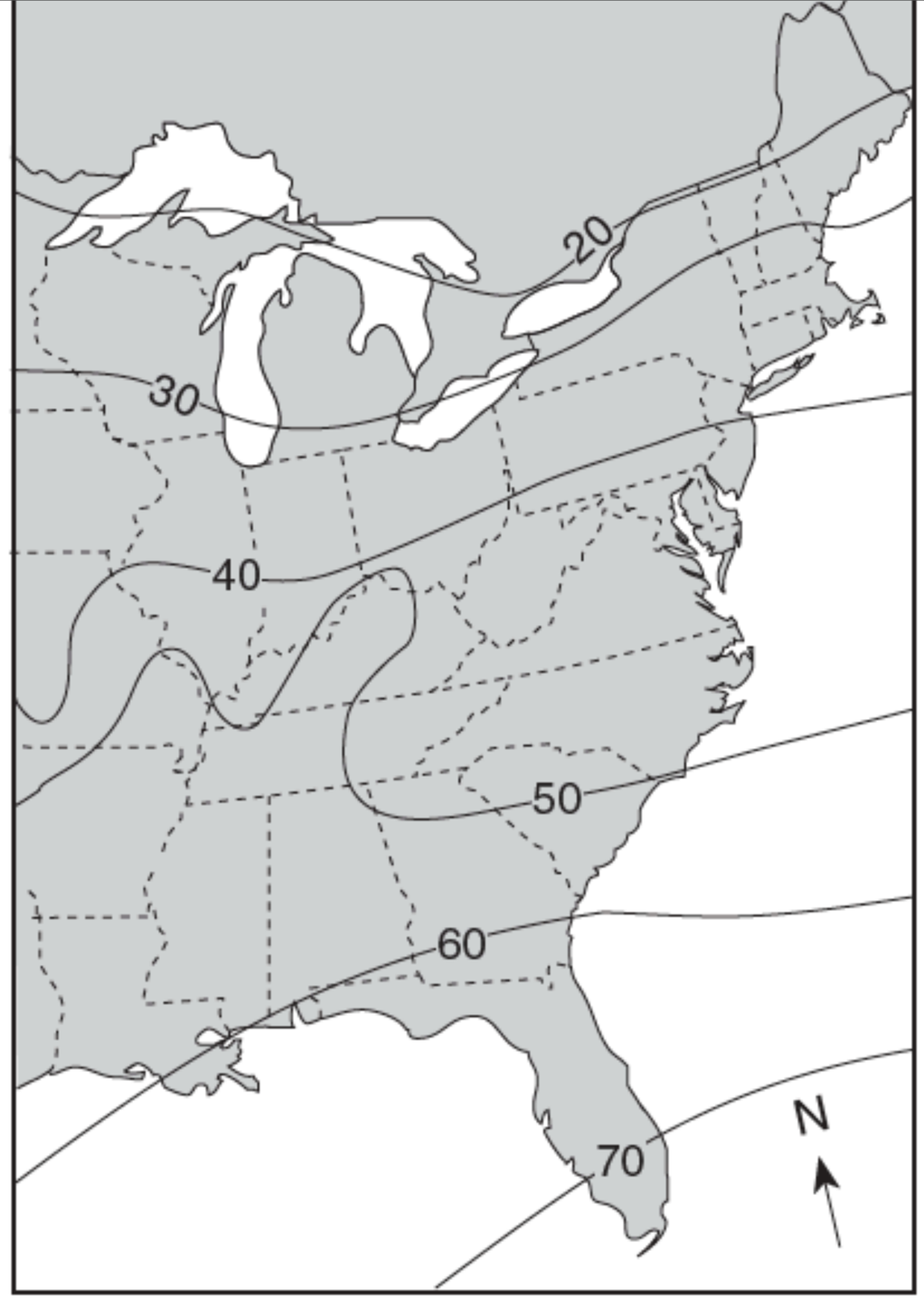

280
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Thursday, June 3, 2010

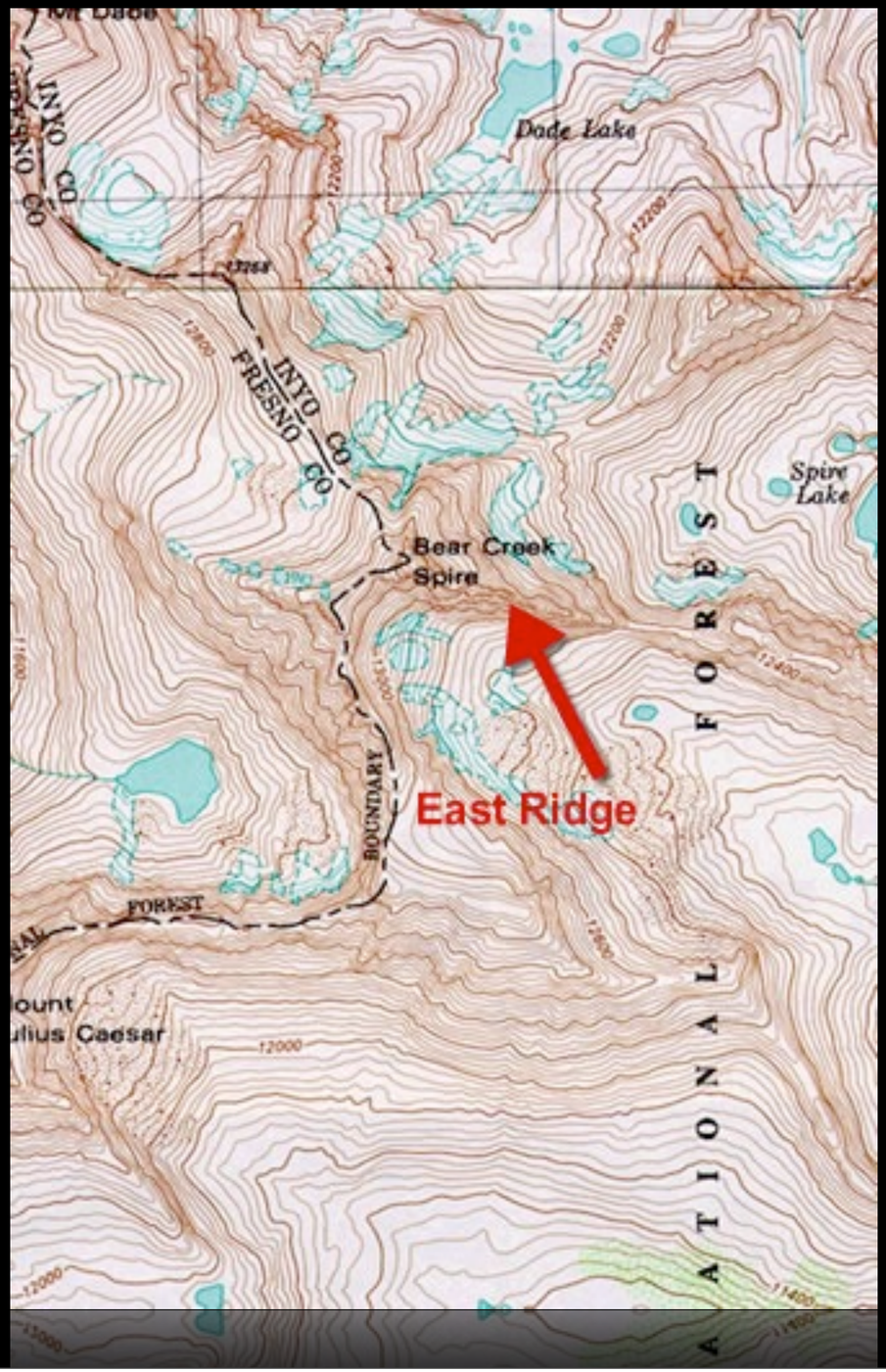
Average Number of Thunderstorms Each Year




20
30
40
50
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N

E. Topographic Maps

1. Topographic maps or Contour maps show the shape of the earth's surface...show elevation in relation to sea level!!!!



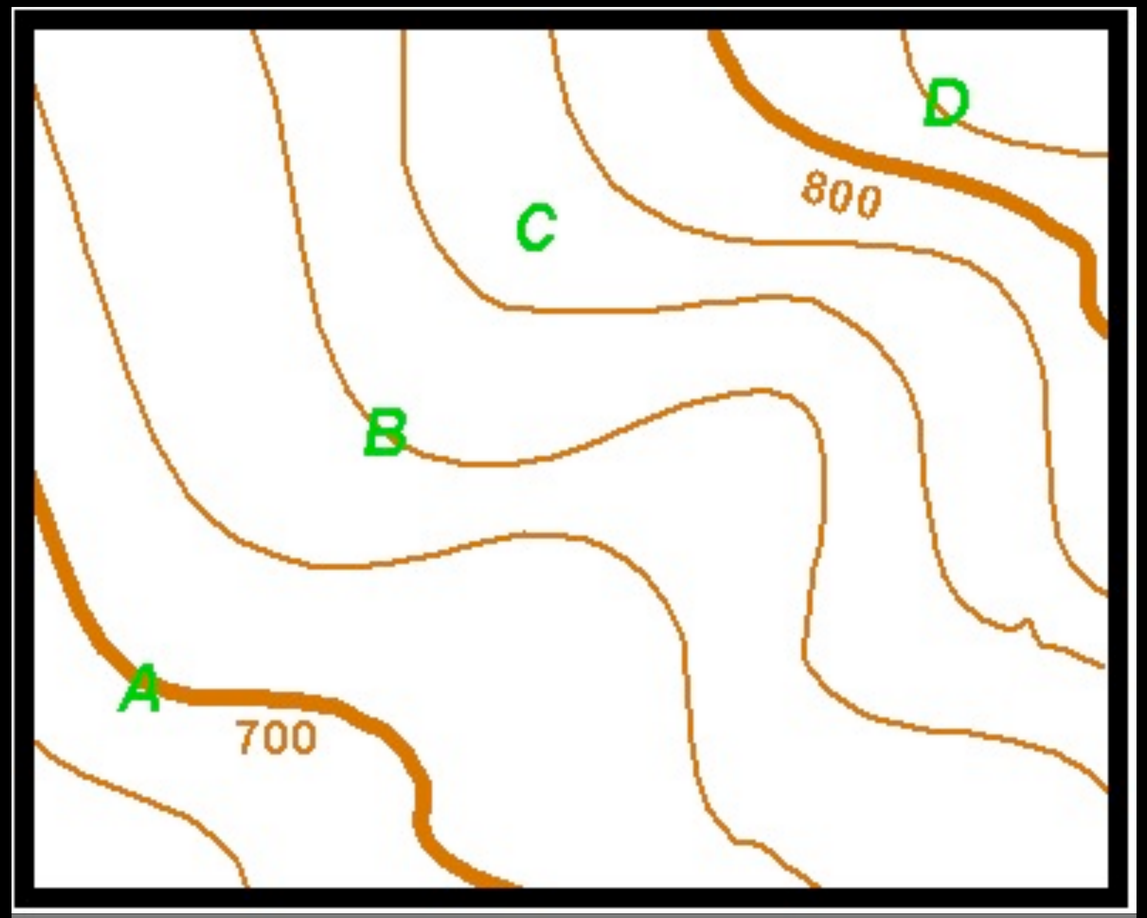
F. Topographic Maps Continued

- **<u>Contour Lines</u>** (Isolines) drawn on the map give elevations (height above sea level)

F. Topographic Maps Continued

- **Contour Lines** (Isolines) drawn on the map give elevations (height above sea level)
- **Contour Interval:** Each contour line is separated from the next by a uniform difference in elevation…each line has a constant interval (just like when setting up axes on a graph)

G. Index Contour Lines



- Darkest of the contour lines.
- They depict certain elevations
- Usually are elevations at a constant interval…such as 100ft, 150ft, 200ft, 250ft,etc.

H. Contour Features

- Contour Lines have 2 basic characteristics:
  - Close lines = steep slope of the ground
  - Far apart lines = gentle slope of the ground
- Other types of features found on a contour map include:
  - Hills-always indicated by closed circles on the map
  - Valleys
  - Depressions: shown with closed ovals & **hachure marks**
  - Cliffs
  - Rivers

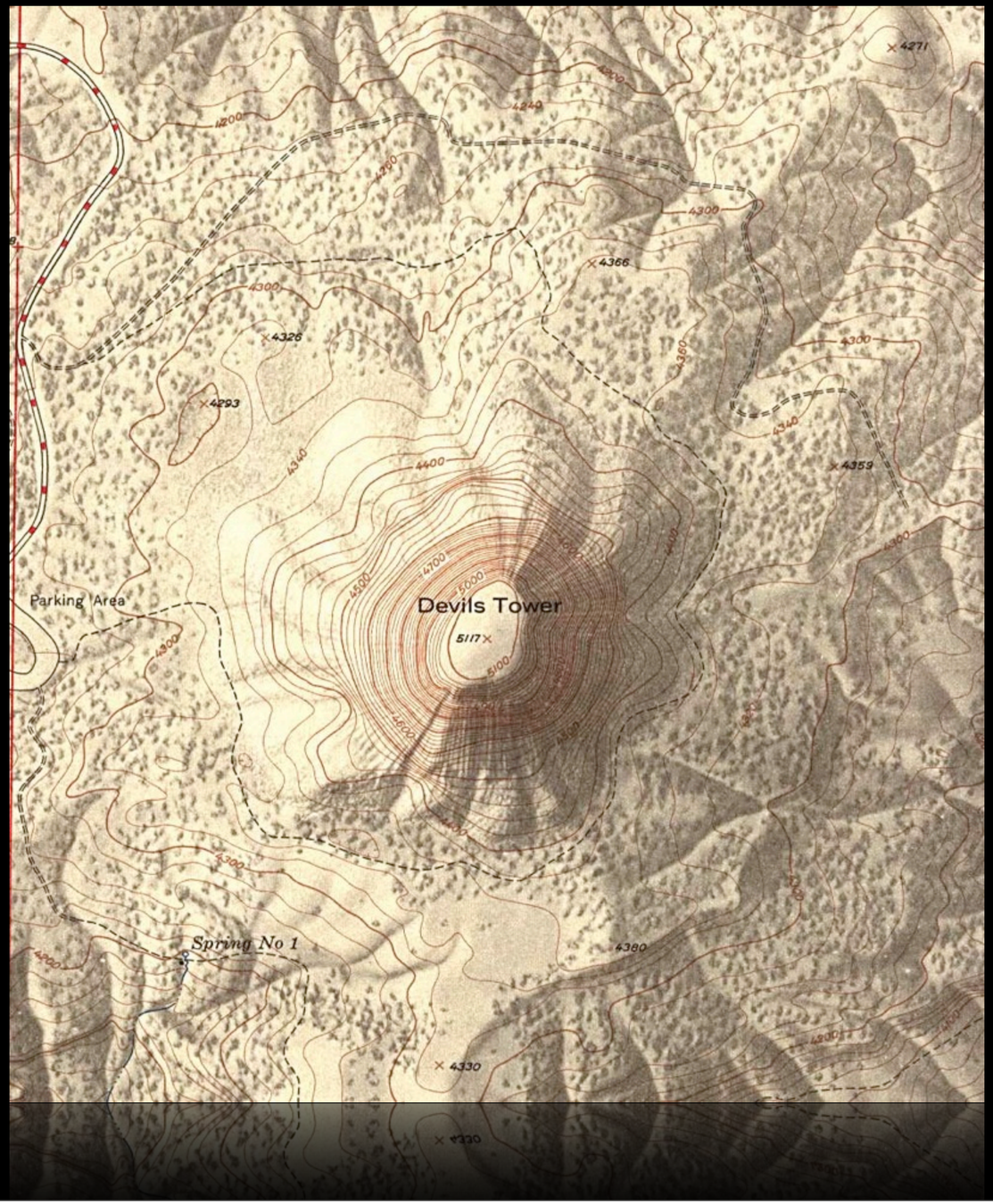
Spacing of Lines

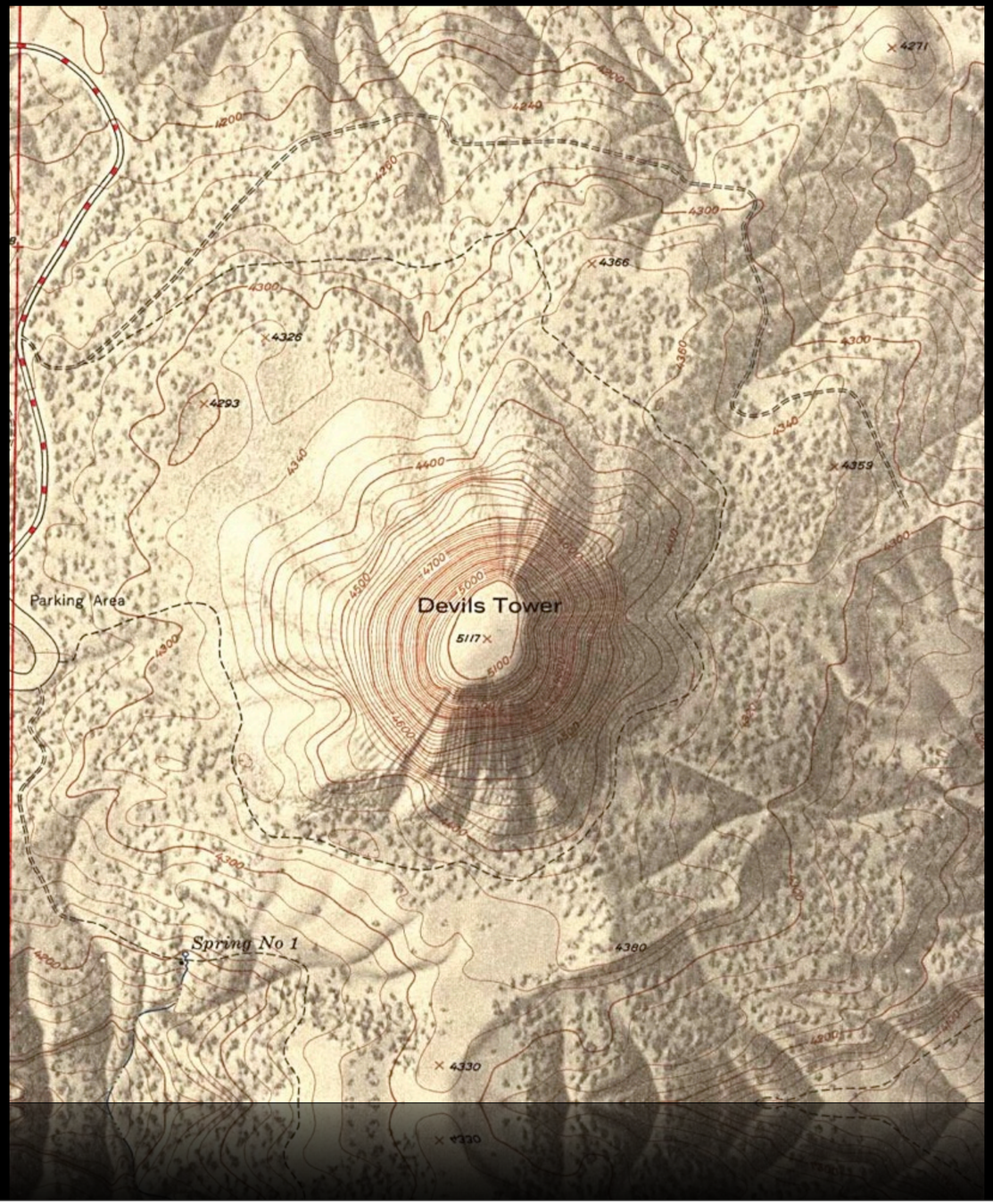


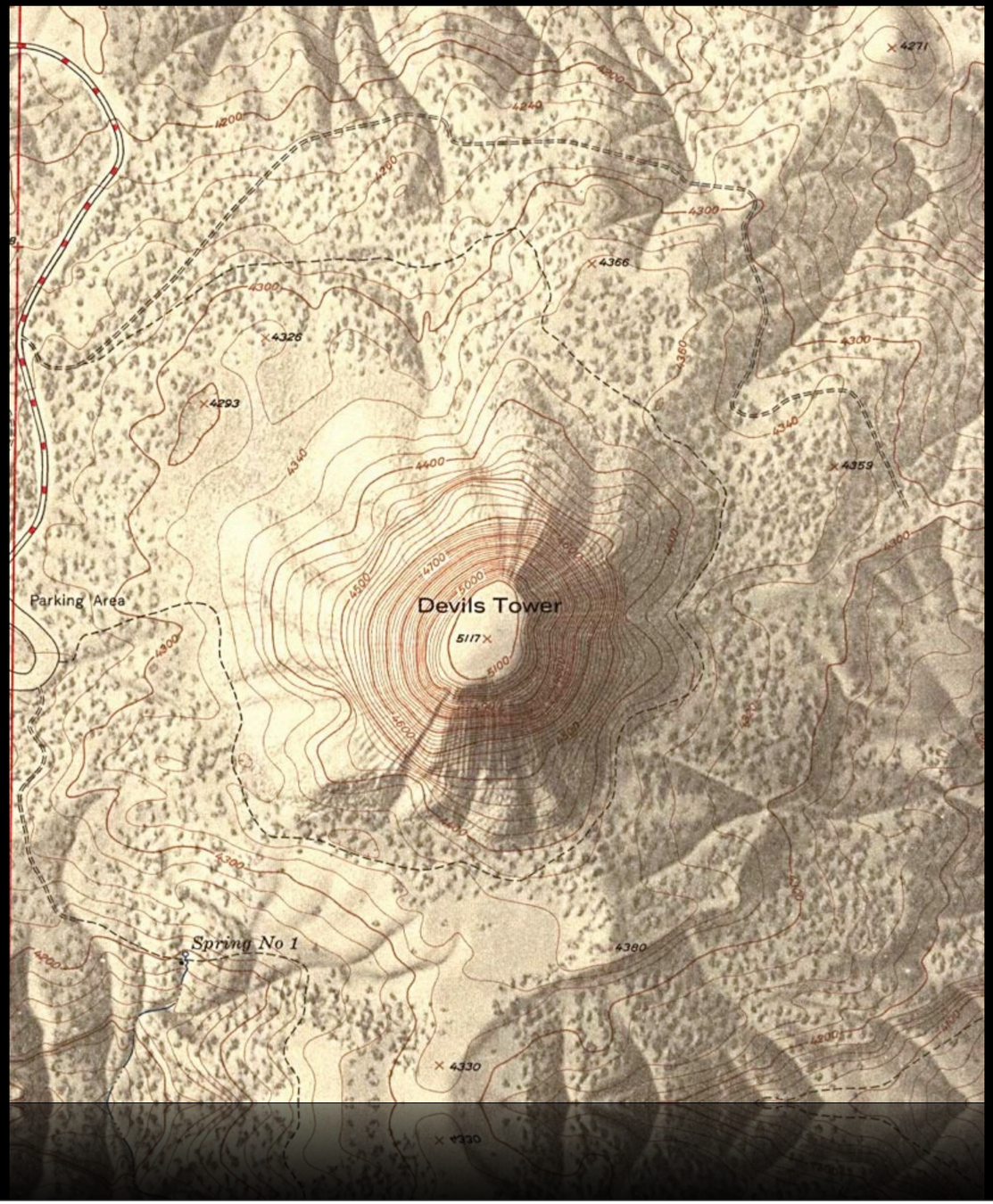







Parking Area
Devils Tower
5117
Spring No 1
4271
4366
4326
4293
4359
4330
4380
4200
4240
4300
4340
4400
4500
4600
4700
5000
5100


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4400
4500
4600
4700
5000
5100



Thursday, June 3, 2010



Thursday, June 3, 2010



Thursday, June 3, 2010

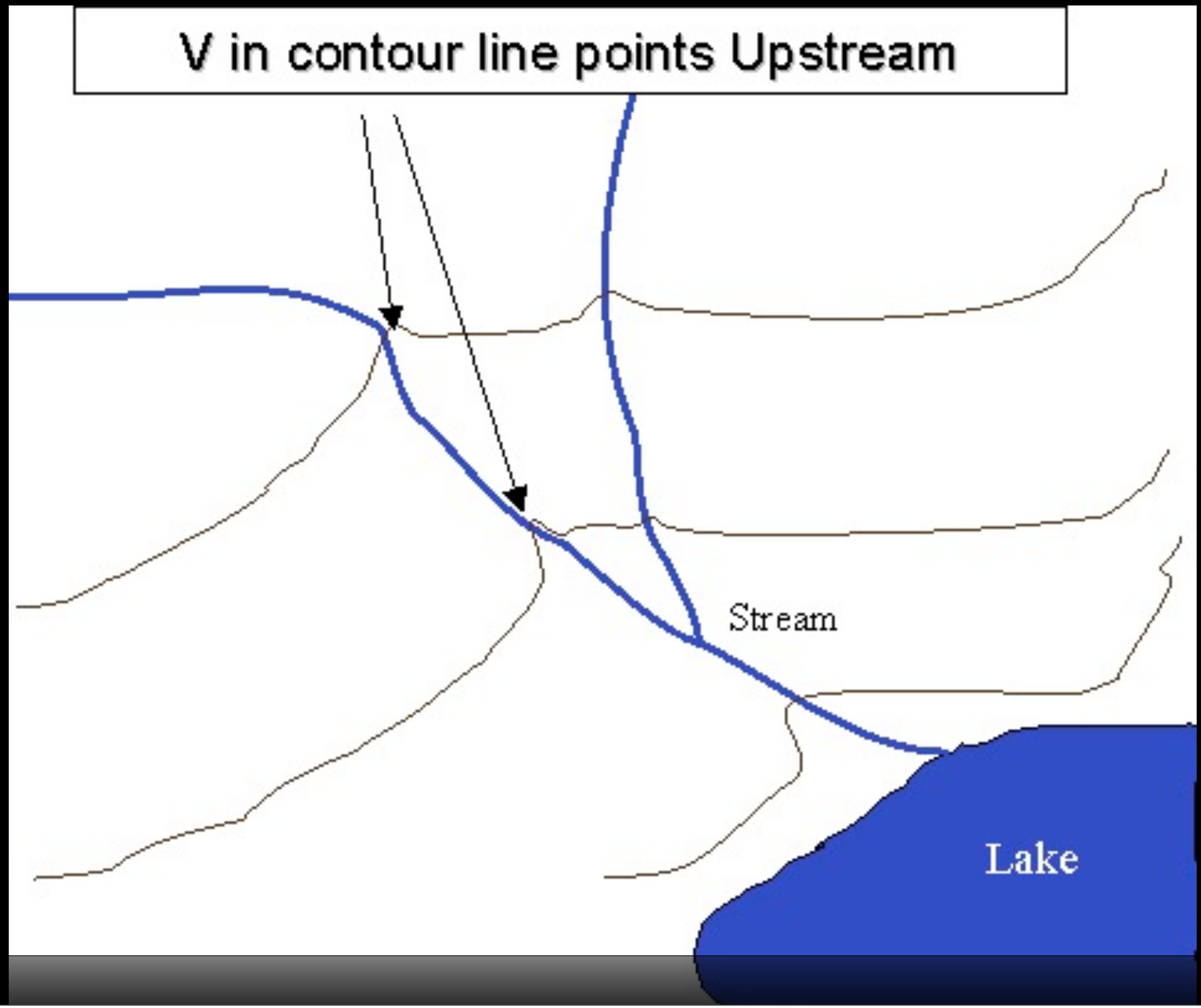
Rivers and Contour Lines

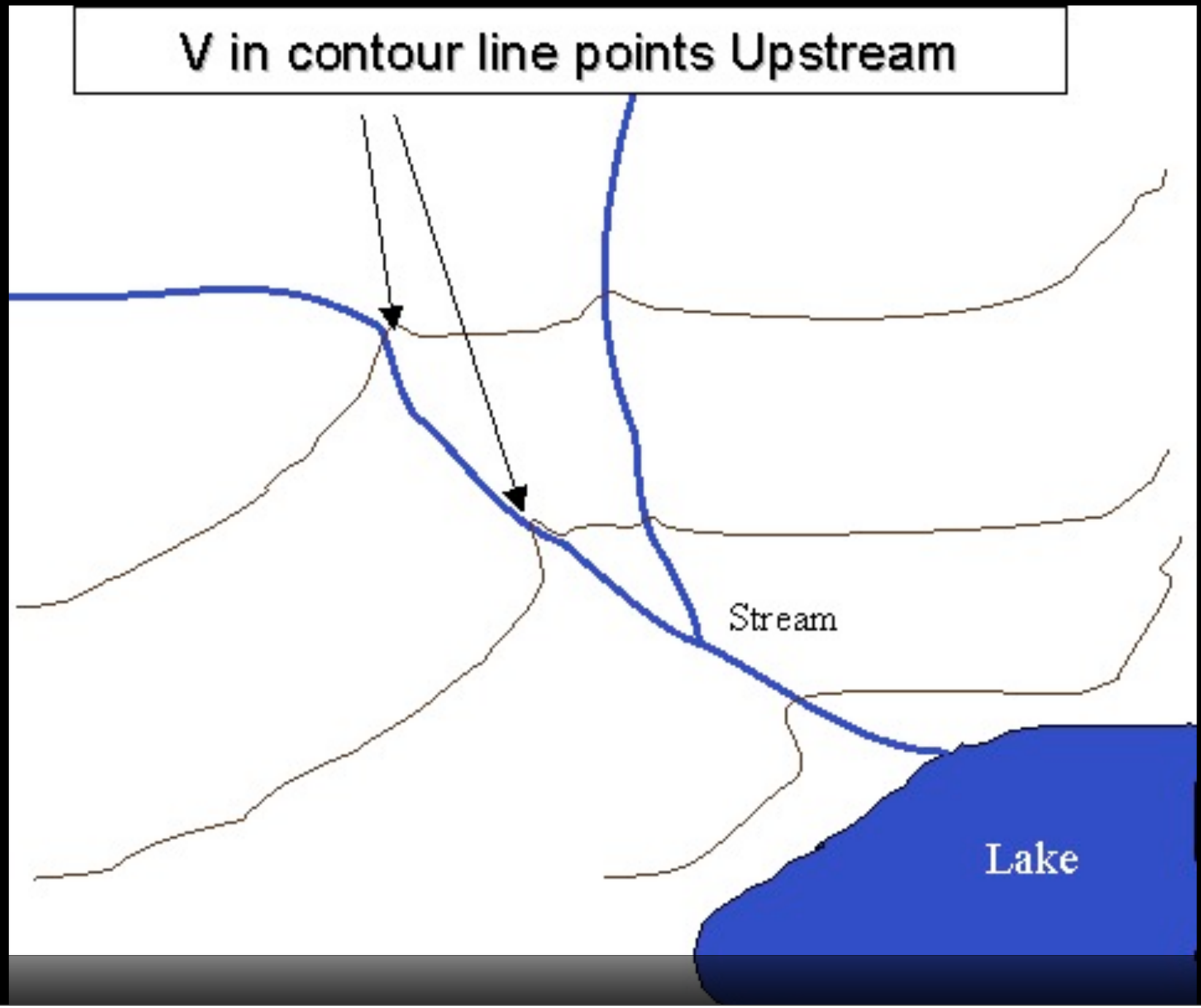
I. Rivers Affect Contour Lines

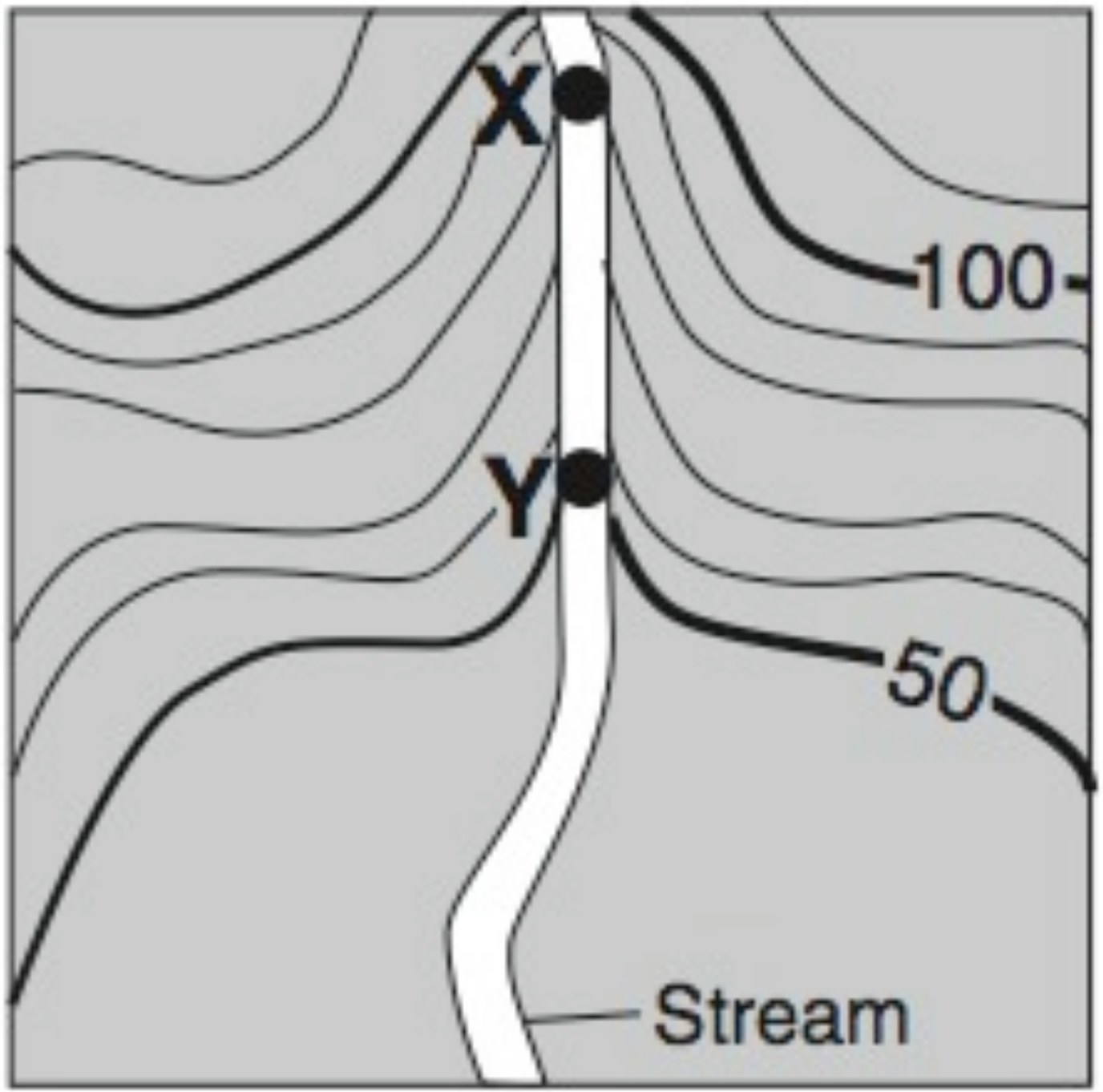
- When a contour line intersects a river, the line crosses the river producing a "V".

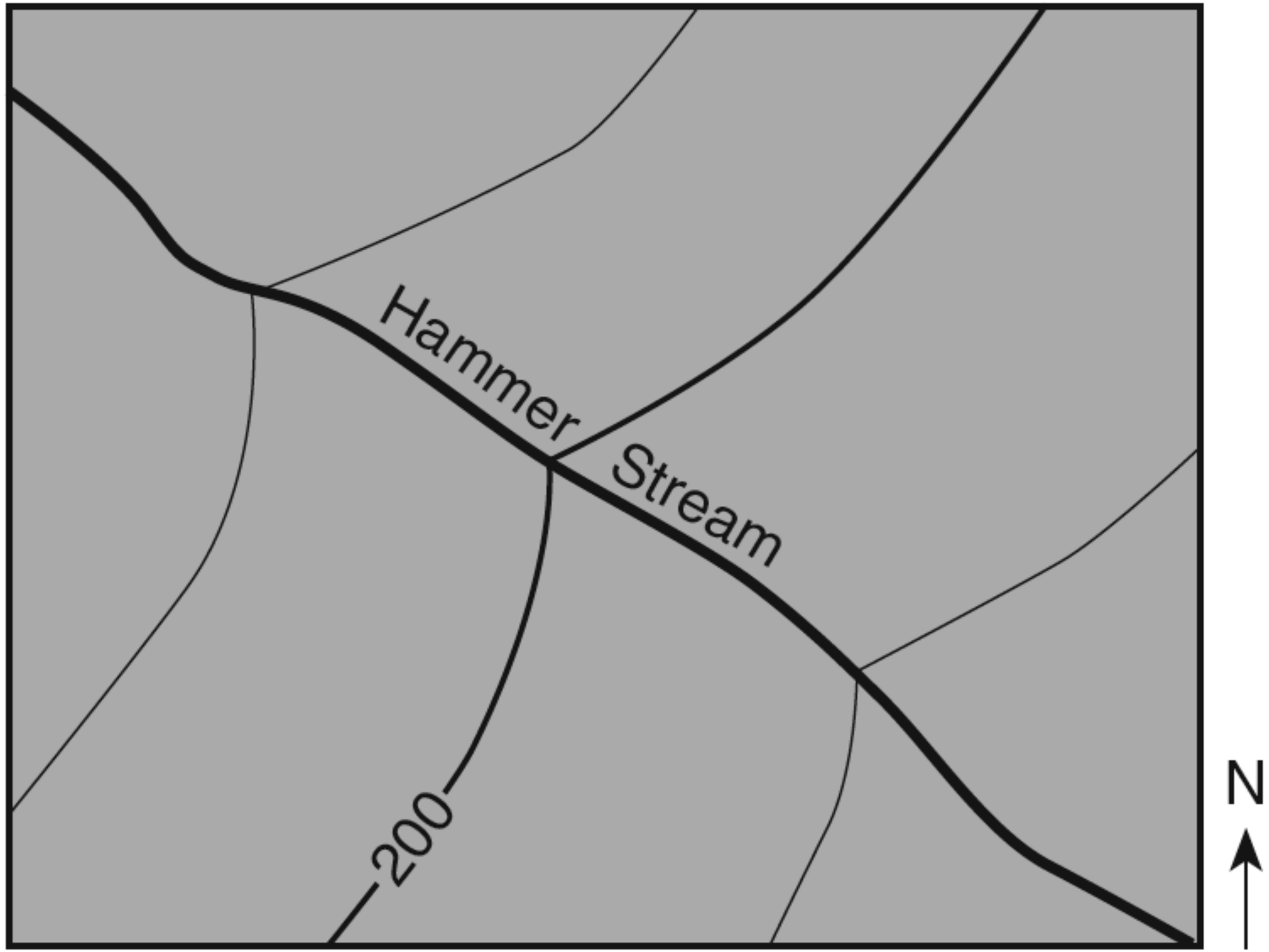
3 Ways to determine Stream Flow Direction:

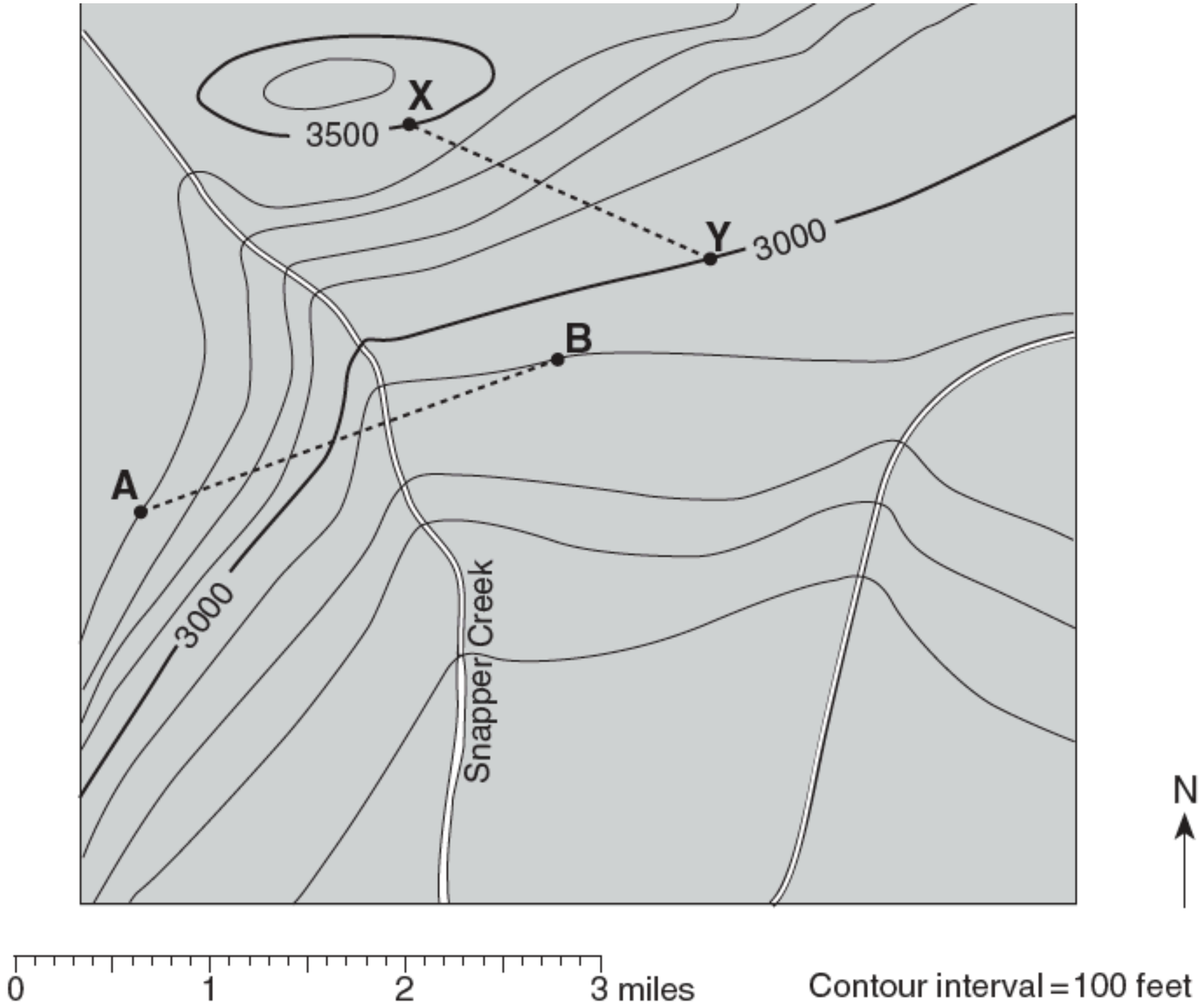
- The tip of the "V" will **ALWAYS** point upstream.
- Rivers ALWAYS flow from high elevation to low elevation.
- Rivers flow "OUT of the V"

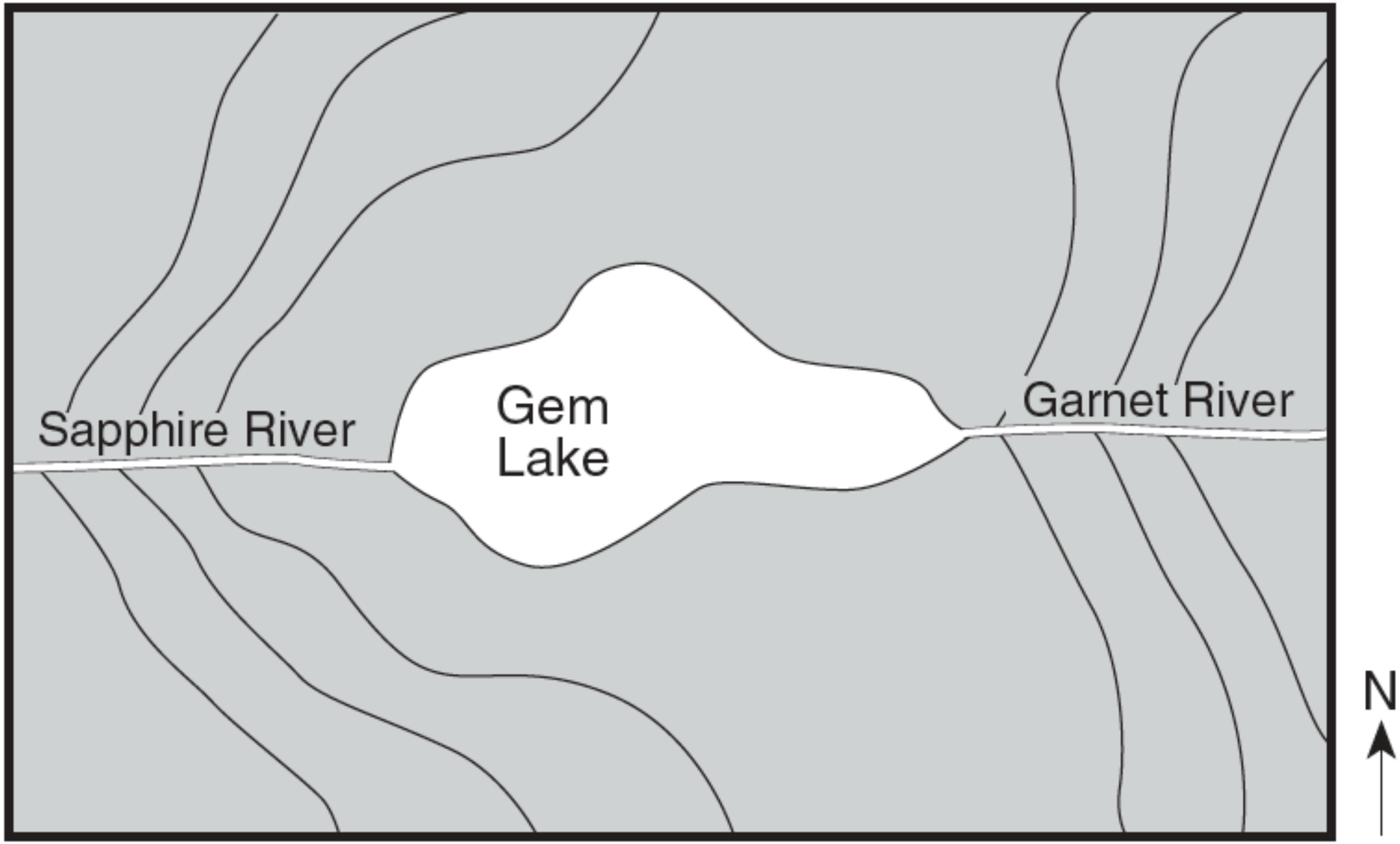

V in contour line points Upstream
Stream
Lake

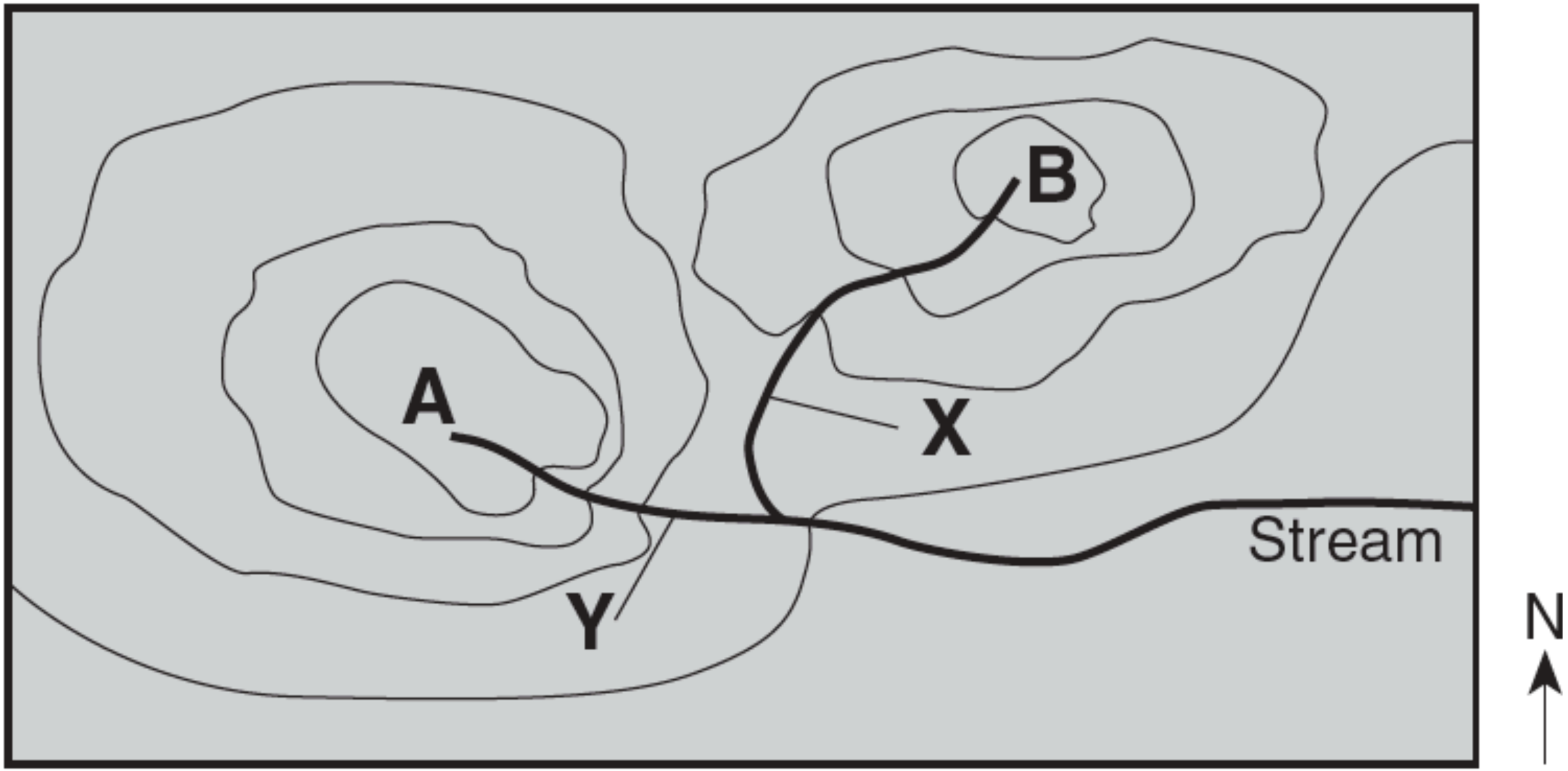

V in contour line points Upstream
Stream
Lake


X
Y
100
50
Stream

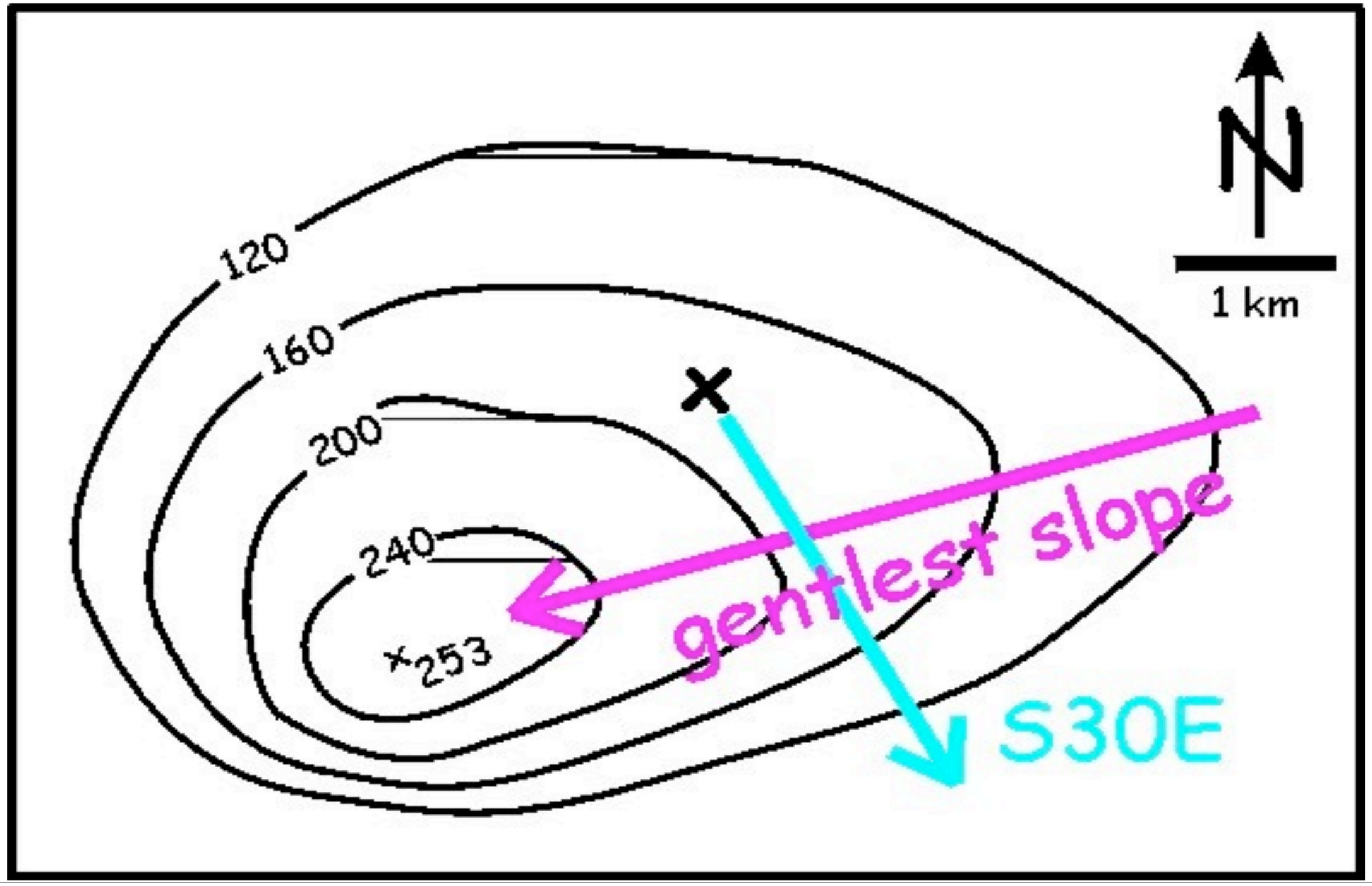

Hammer
Stream
200
N

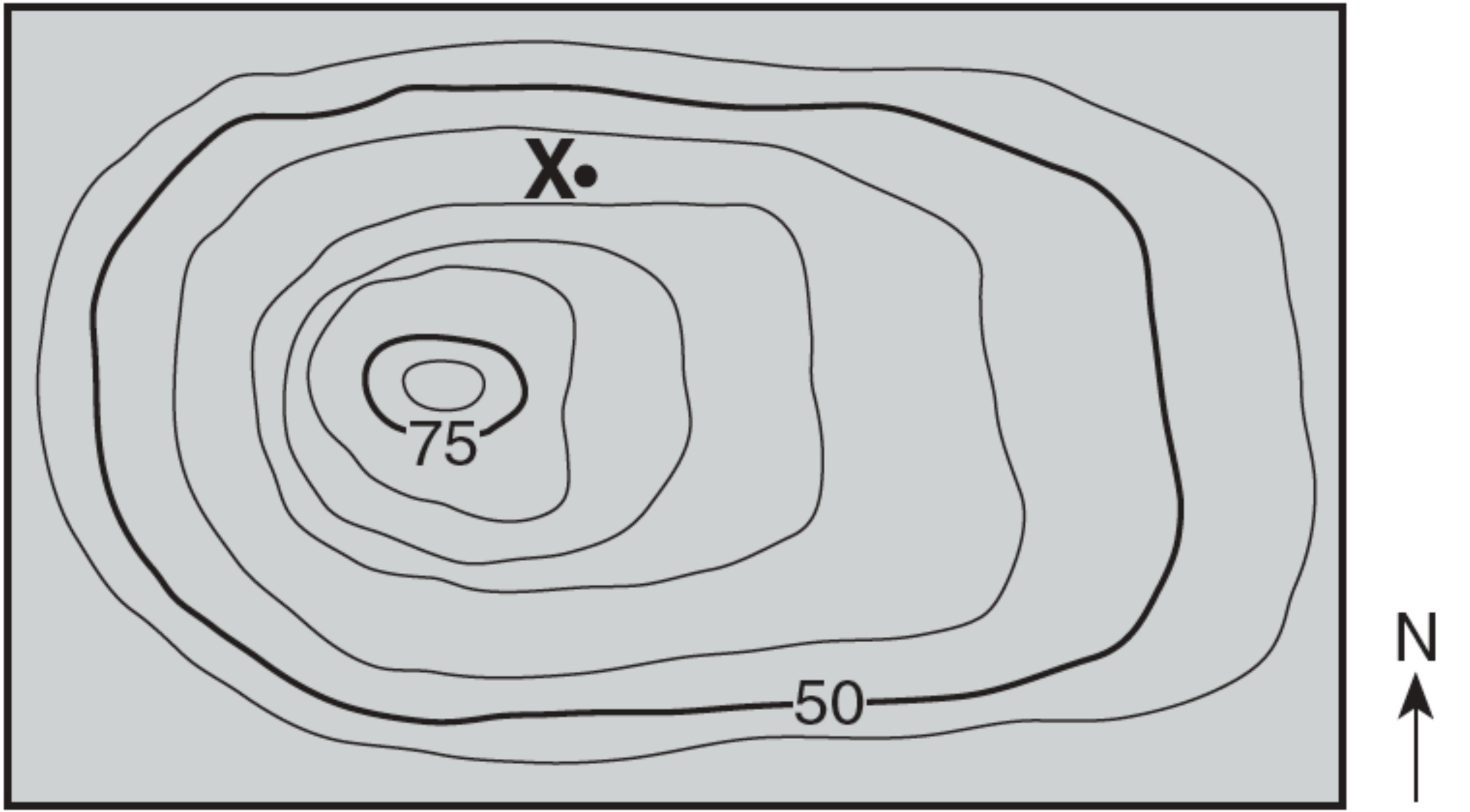

X
3500
Y
3000
B
A
3000
Snapper Creek
N
0
1
2
3 miles
Contour interval = 100 feet

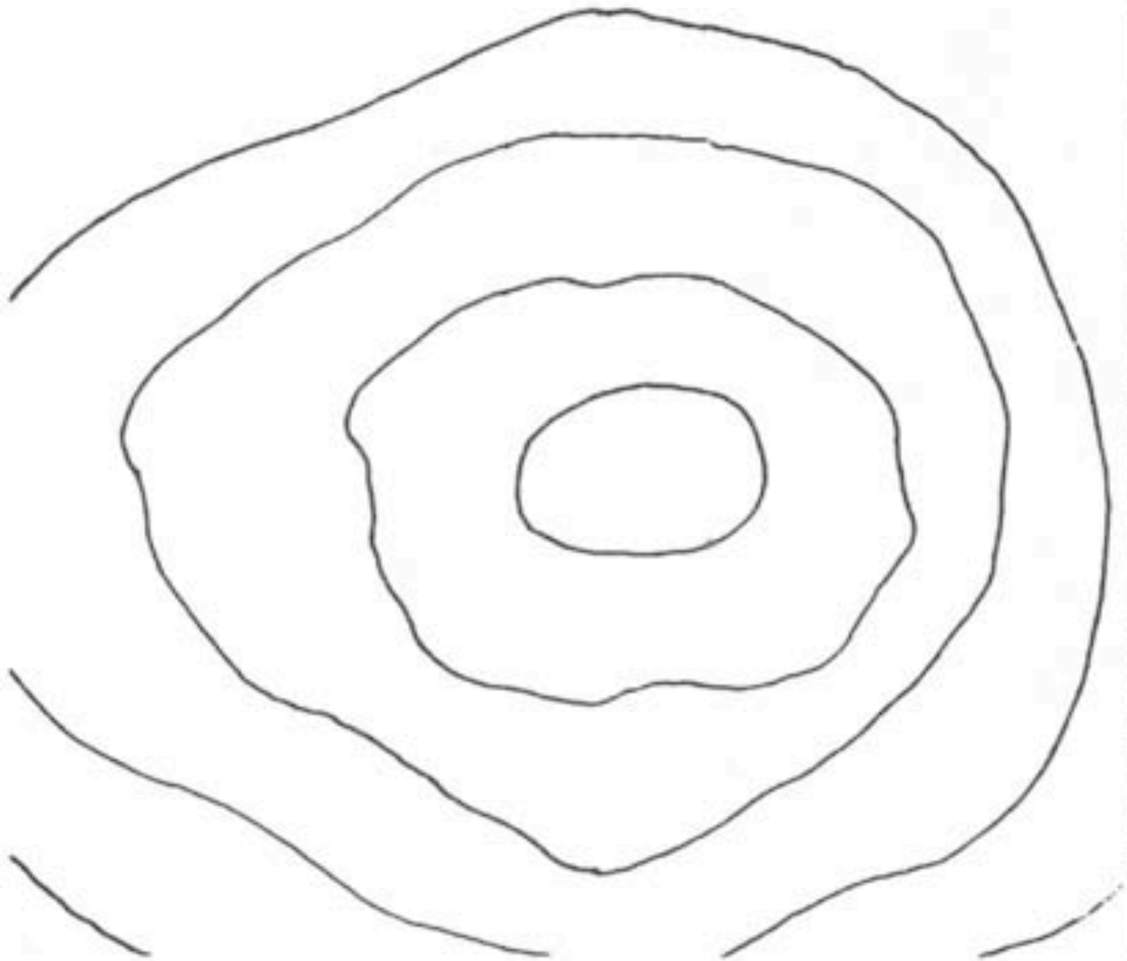

Sapphire River
Gem
Lake
Garnet River
N

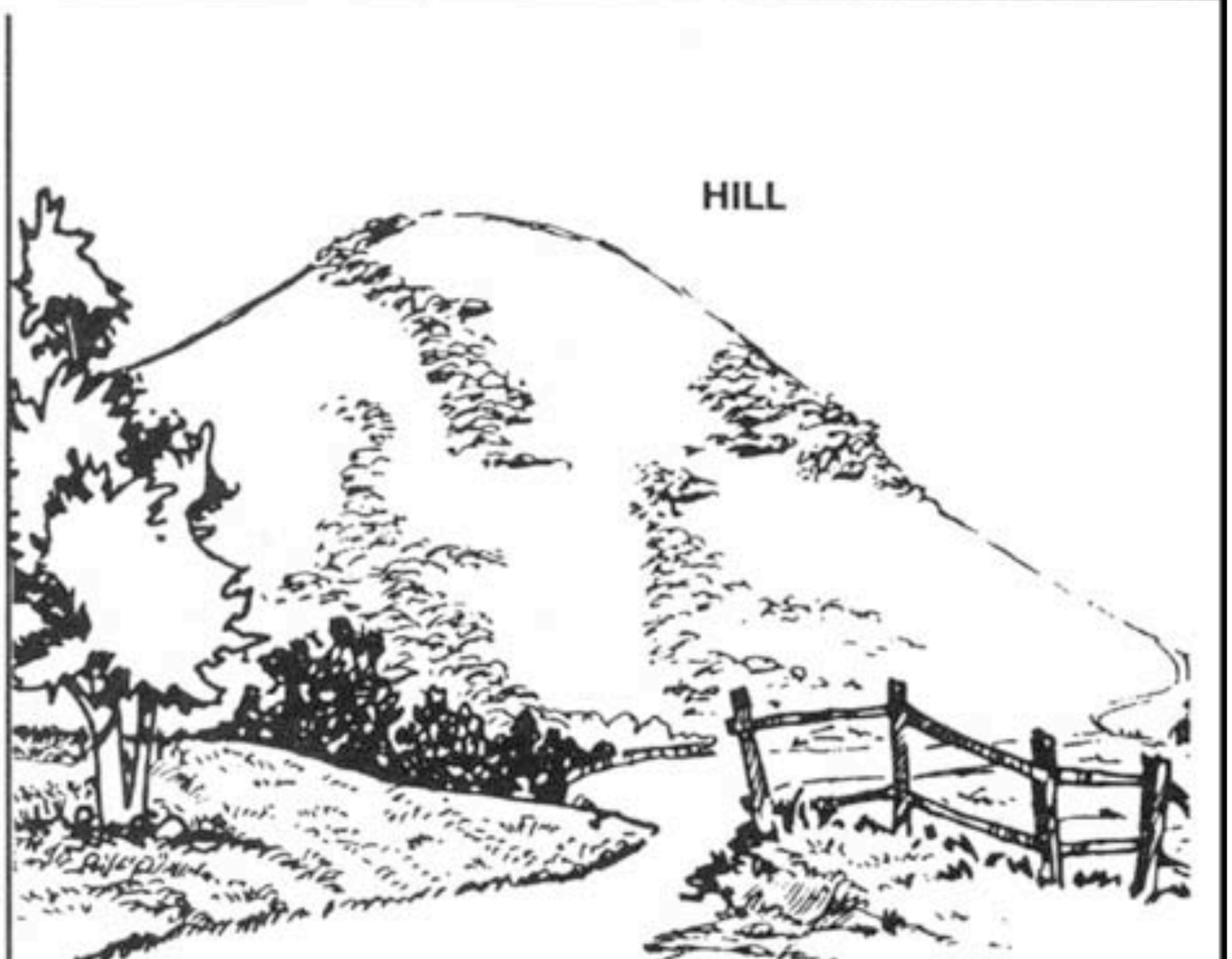

B
A
X
Y
Stream
N

Hill

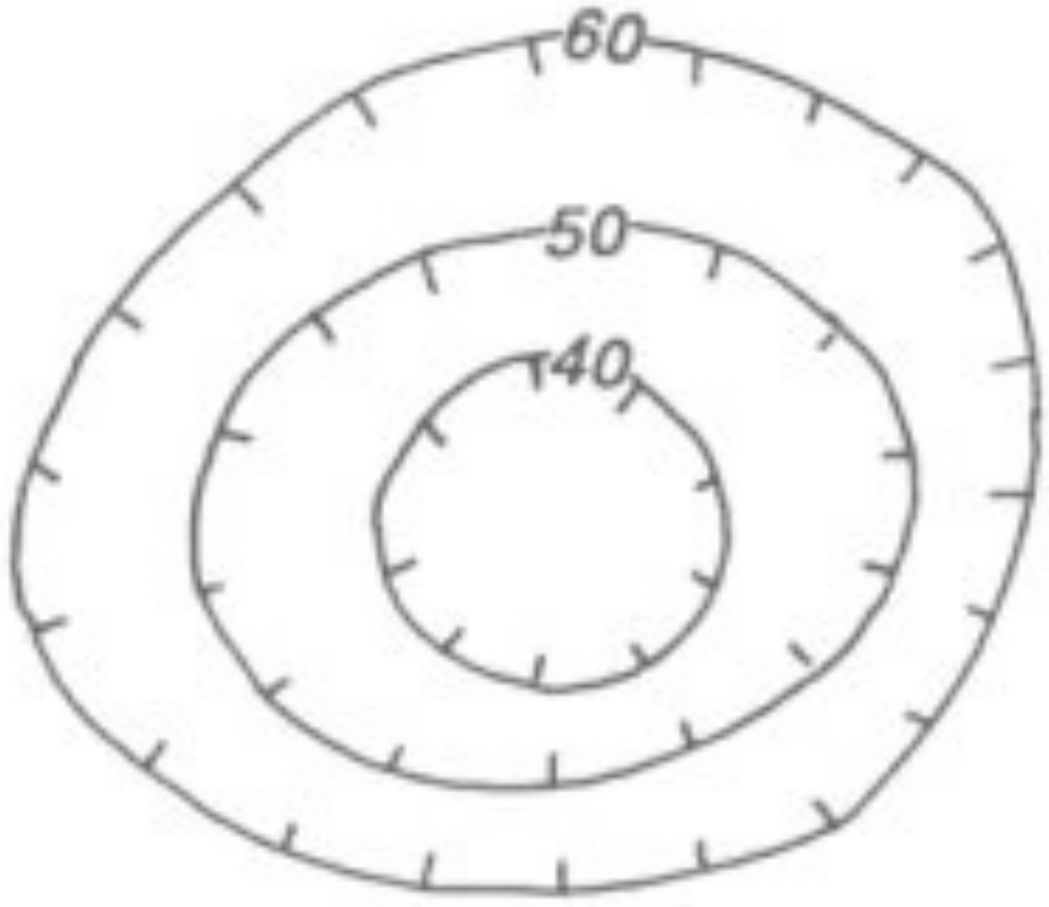

120
160
200
240
253
1 km
gentlest slope
S30E

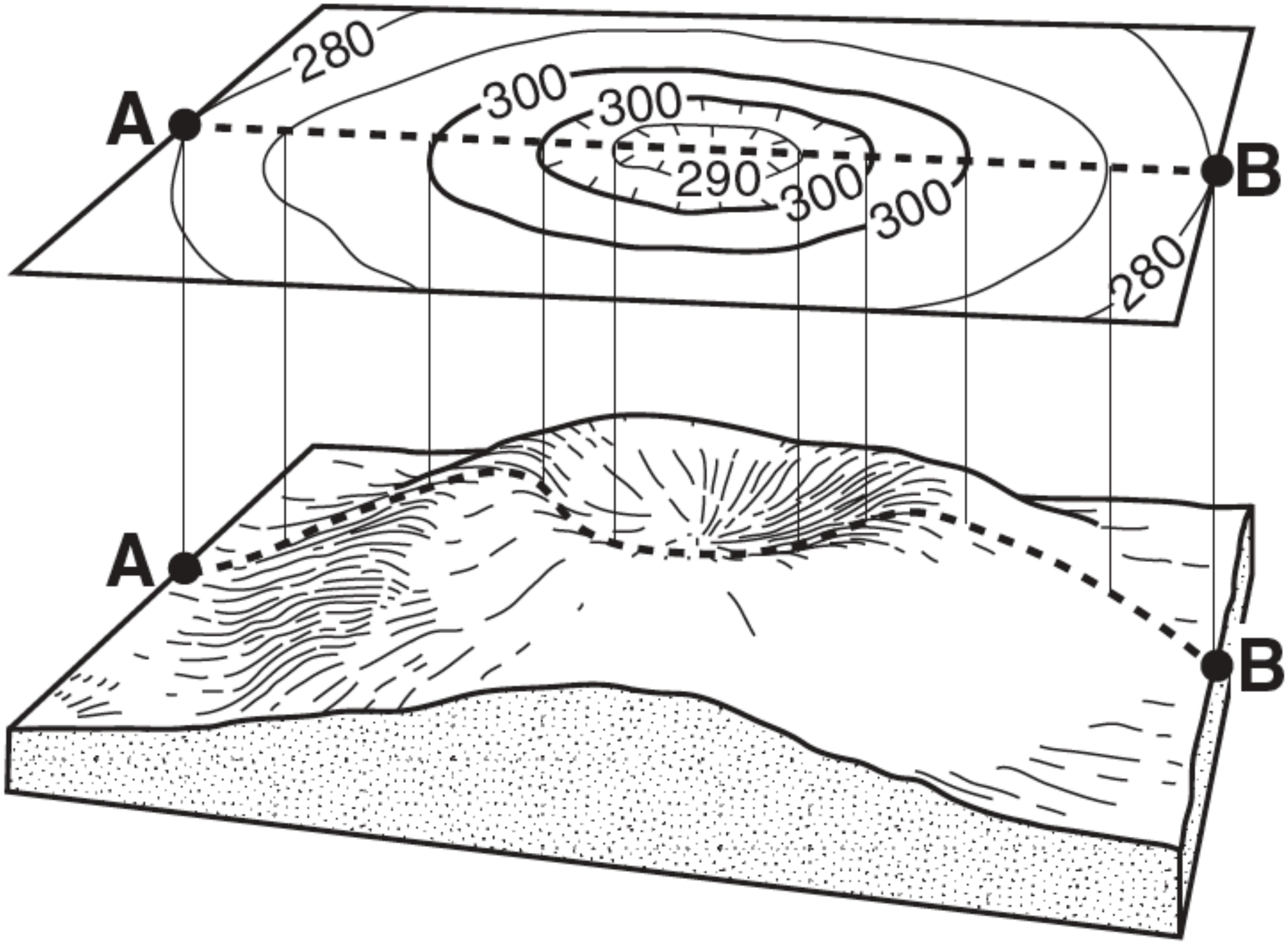

X
75
50
N




HILL

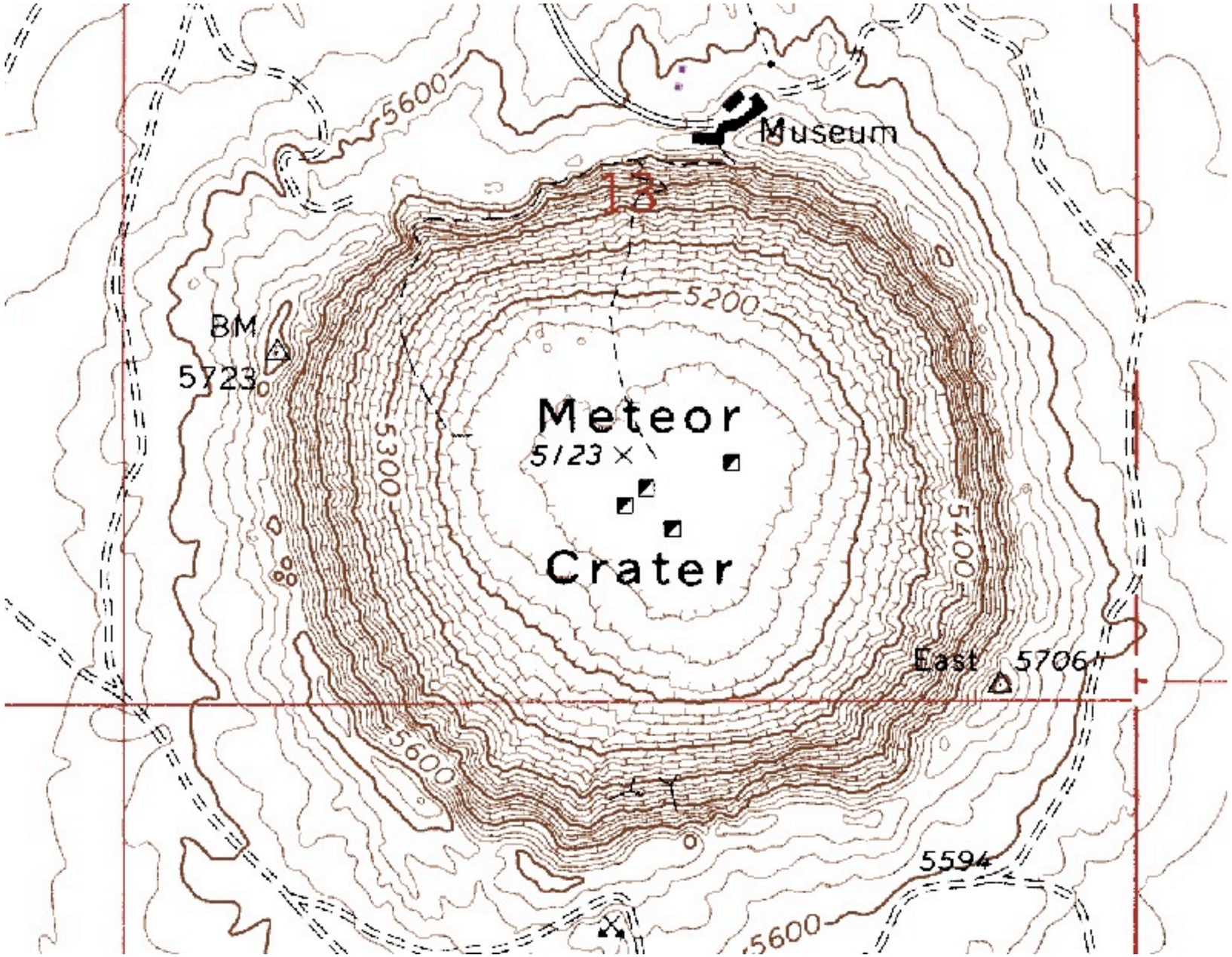
Depression (Ditch or Volcano Top)


60
50
40


280
300
300
290
300
300
280
A
B
A
B

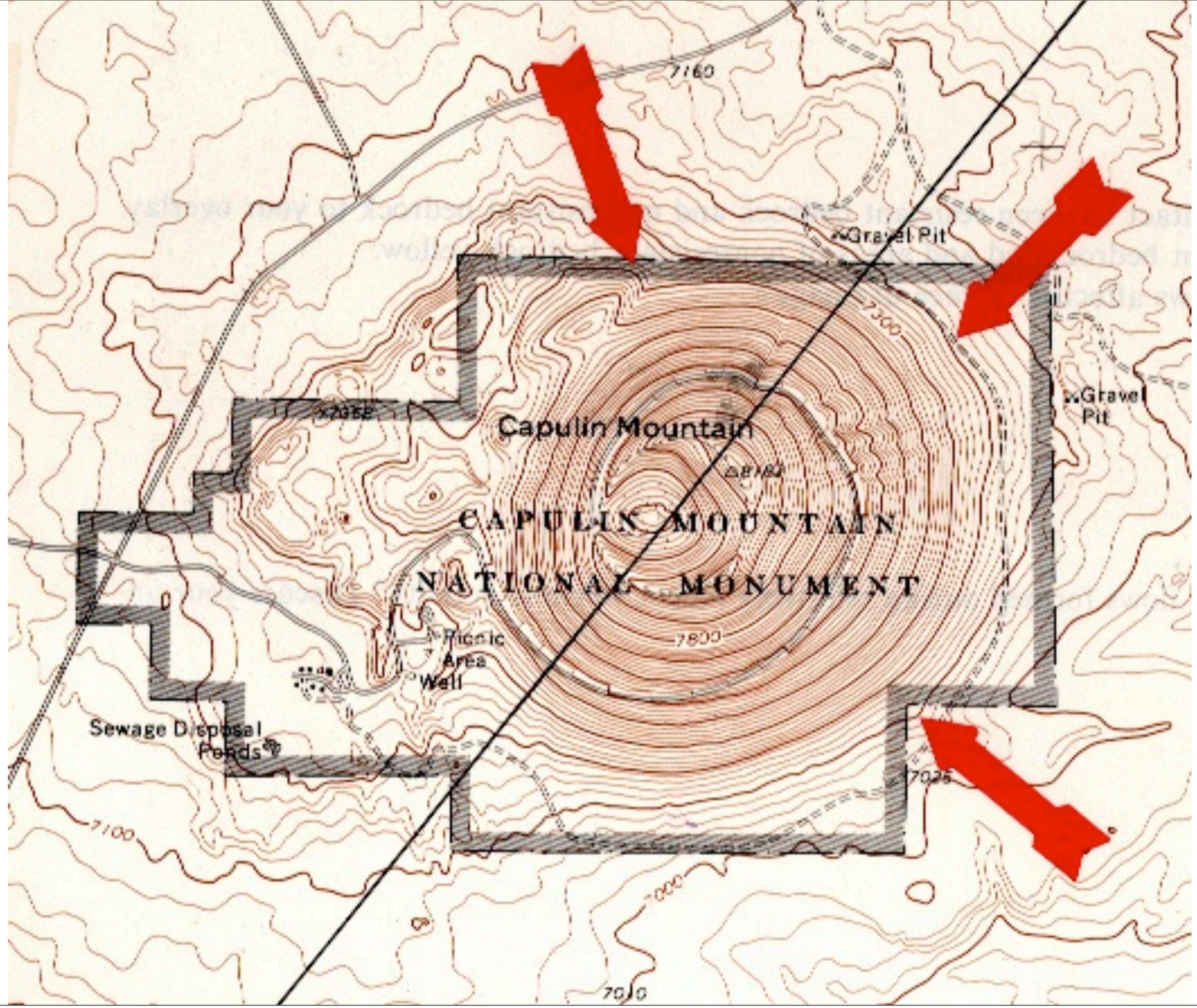
Meteor Crater




5600
Museum
13
5200
BM
5723
Meteor
5123
5300
5400
Crater
East
5706
5600
5594
5600






Gravel Pit
Capulin Mountain
CAPULIN MOUNTAIN
NATIONAL MONUMENT
Gravel Pit
Picnic Area
Well
Sewage Disposal Ponds
7160
7300
7800
7100
7000

J. Hills and Depressions

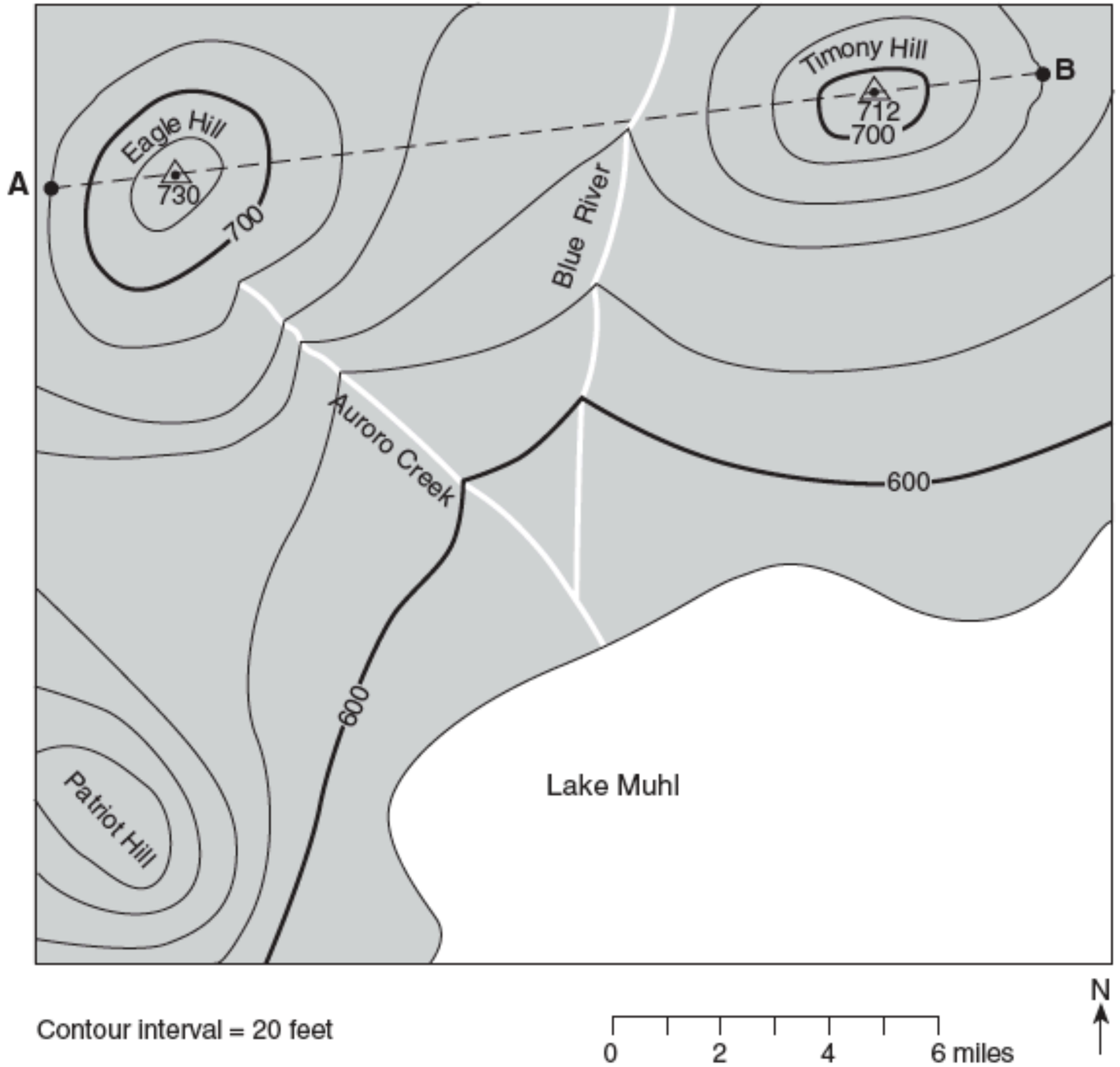
- With a Hill, the highest possible point will be 1 value less than the next possible contour line.

- With a Depression, the lowest possible point will be 1 value greater than the next possible contour line.

K. Bench Marks

- Show Exact Elevation at a location
- Distinguished by a “BM” or an “X”

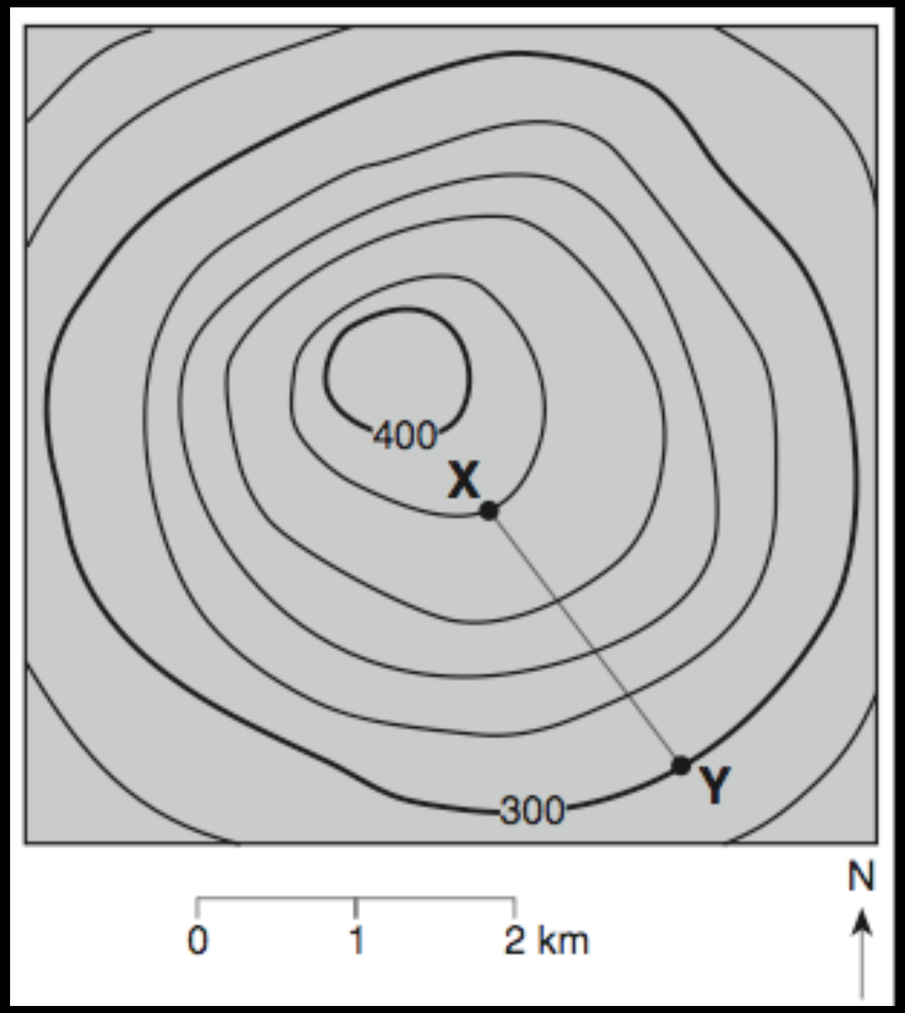
Topographic Map




U.S. COAST & GEODETIC
WASHINGTON, D.C.
1943


U.S. COAST & GEODETIC
WASHINGTON, D.C.
1943

L. Gradient

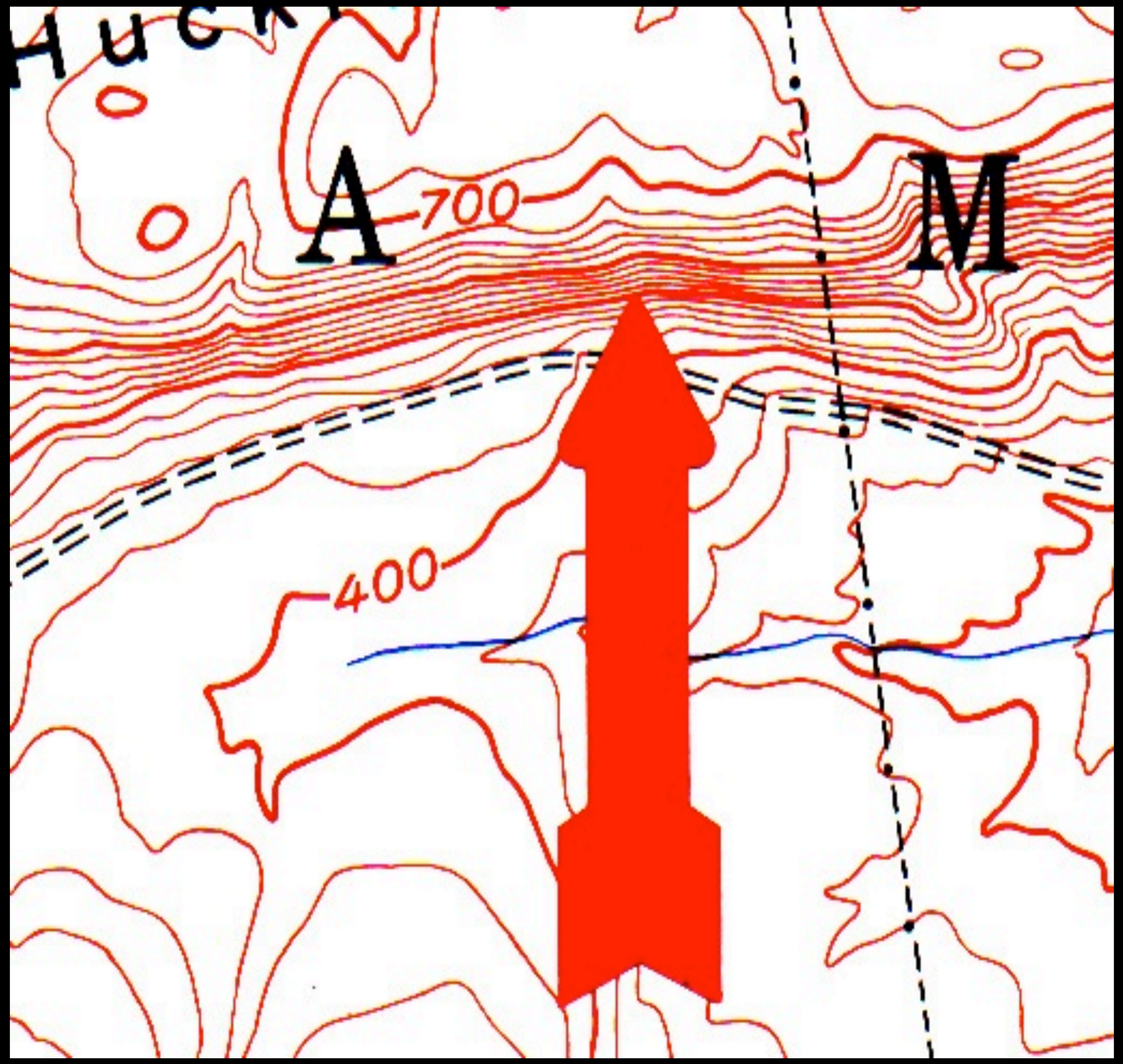


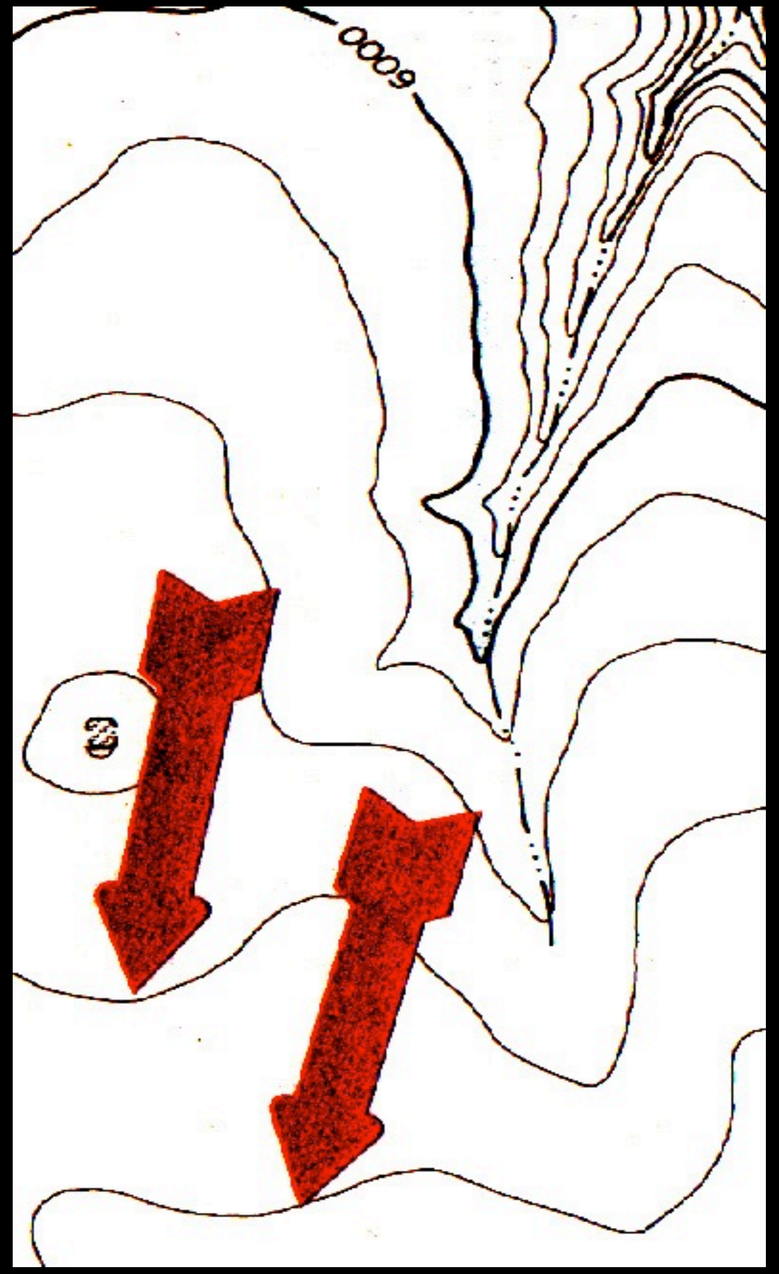
Gradient = $\frac{\text{Change if Field Value}}{\text{Distance}}$

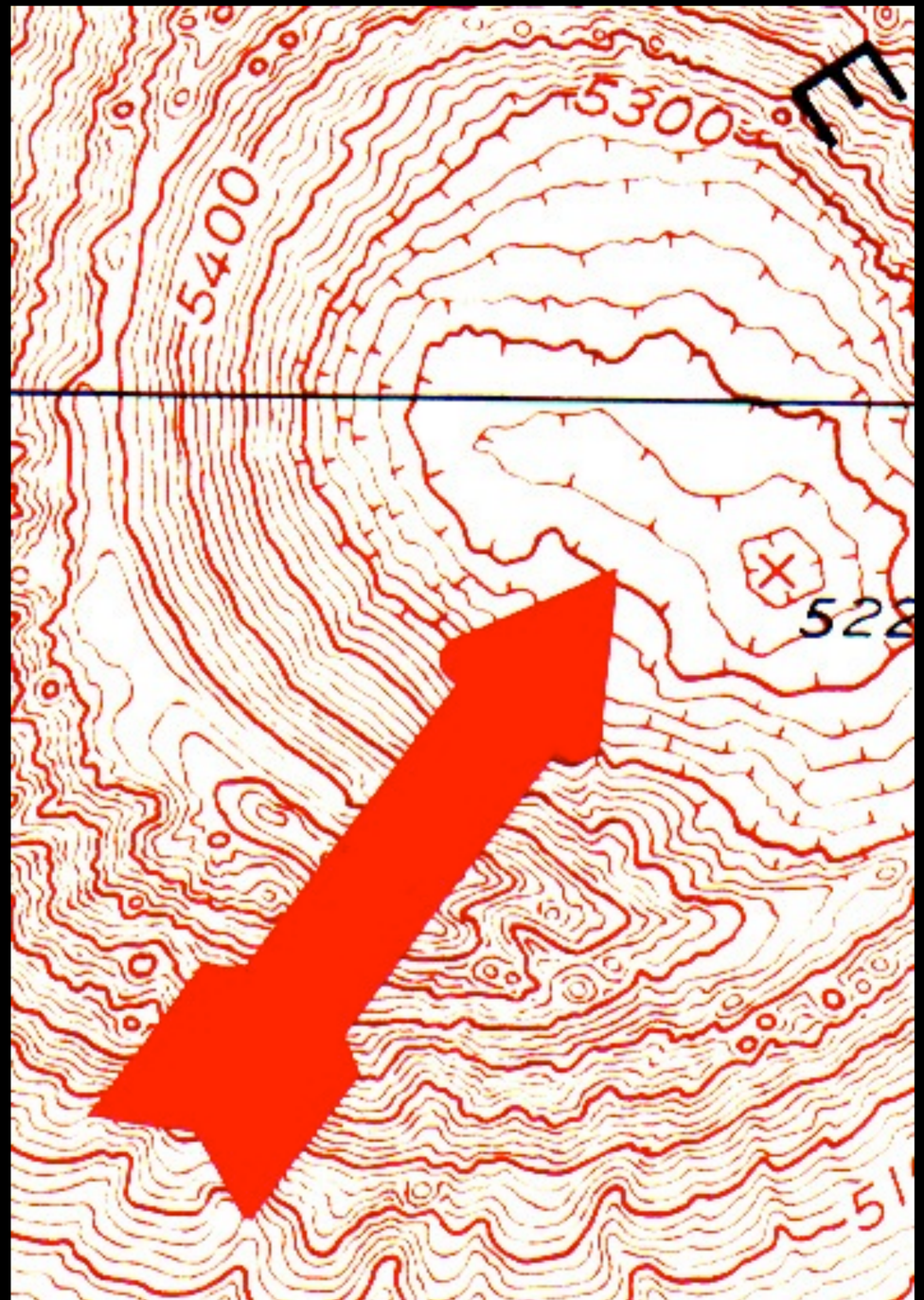
How Much Change occurs over a specific distance

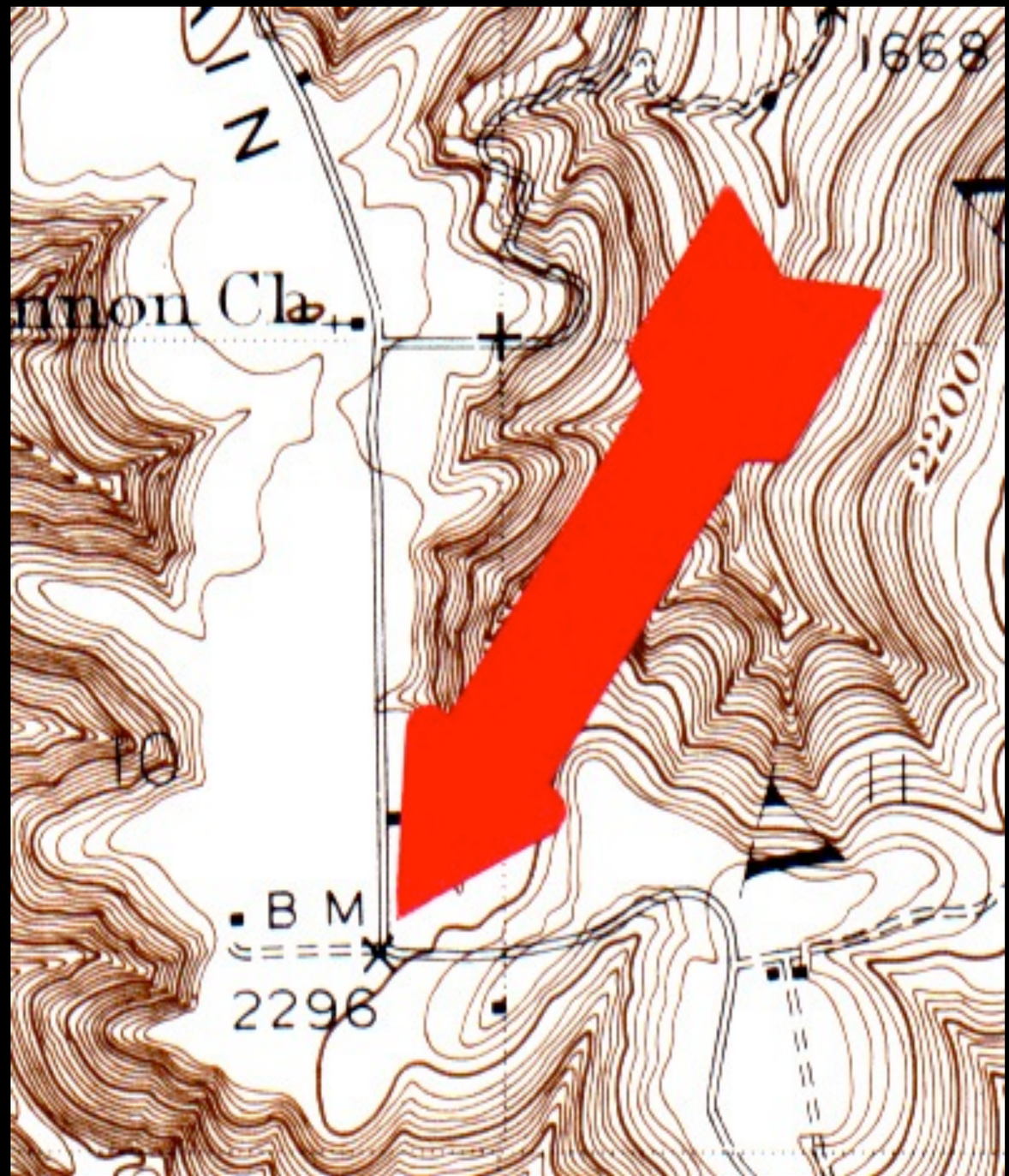
Greatest Gradient will be biggest change over the shortest distance

(Field Values are anything that can be measured... wind speed, elevation, miles, feet, etc.)


A
M
700
400


6000


5400
5300
522
51

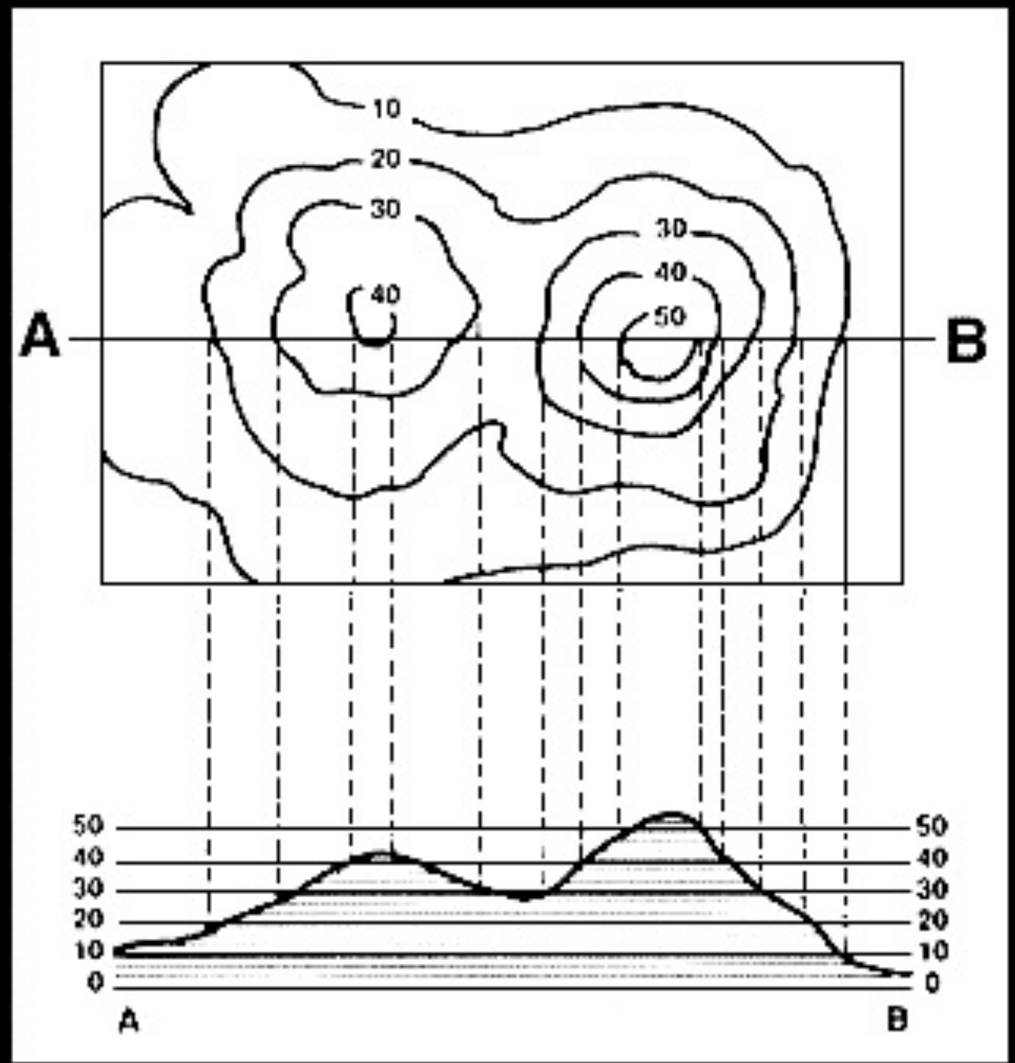

1668
2200
mon Cl
PO
B M
2296

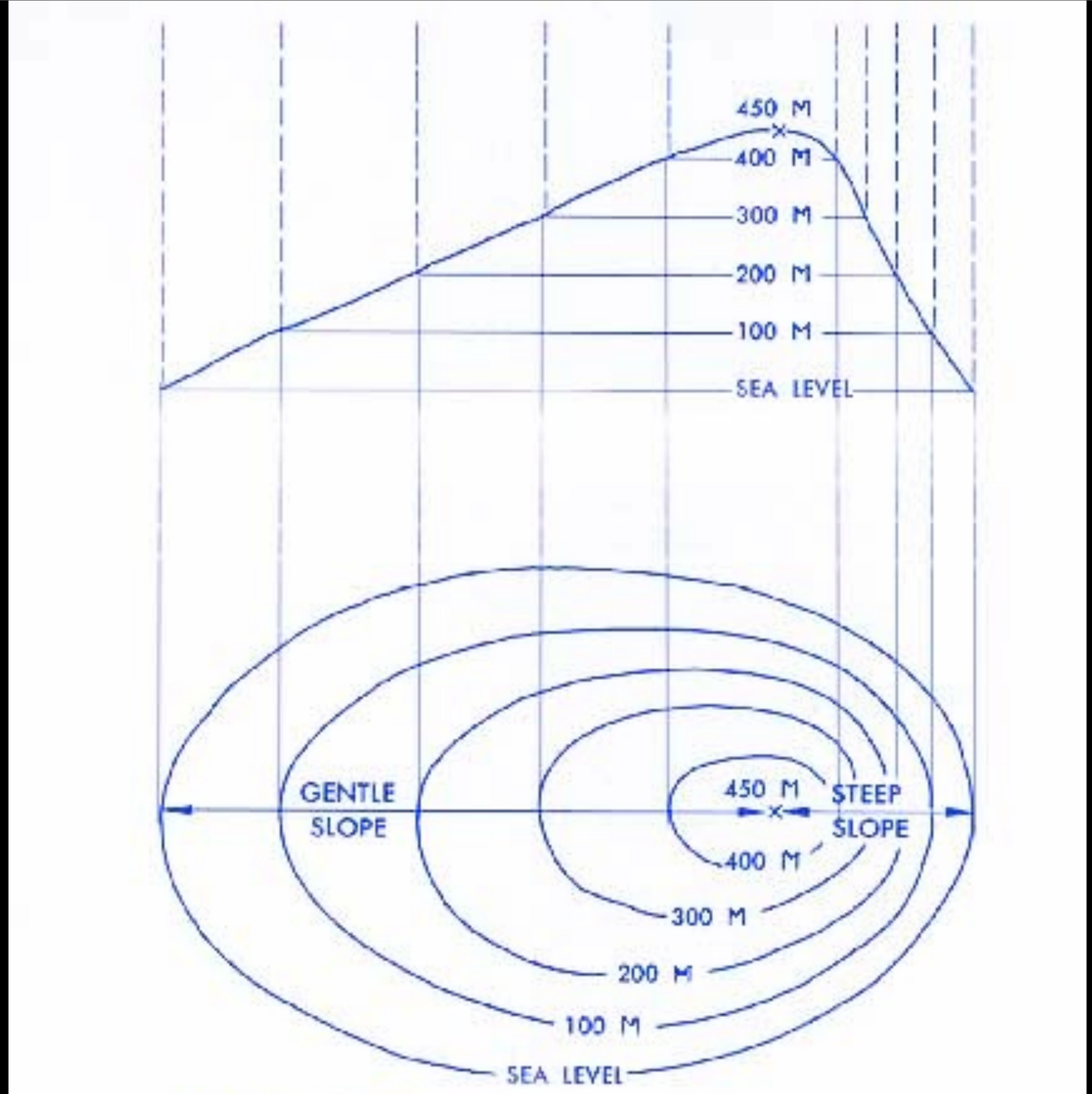
M. Topographic Profiles

- Is a cross-sectional or side view that shows the elevations of the land along a particular baseline
- Vertical slice of the topography

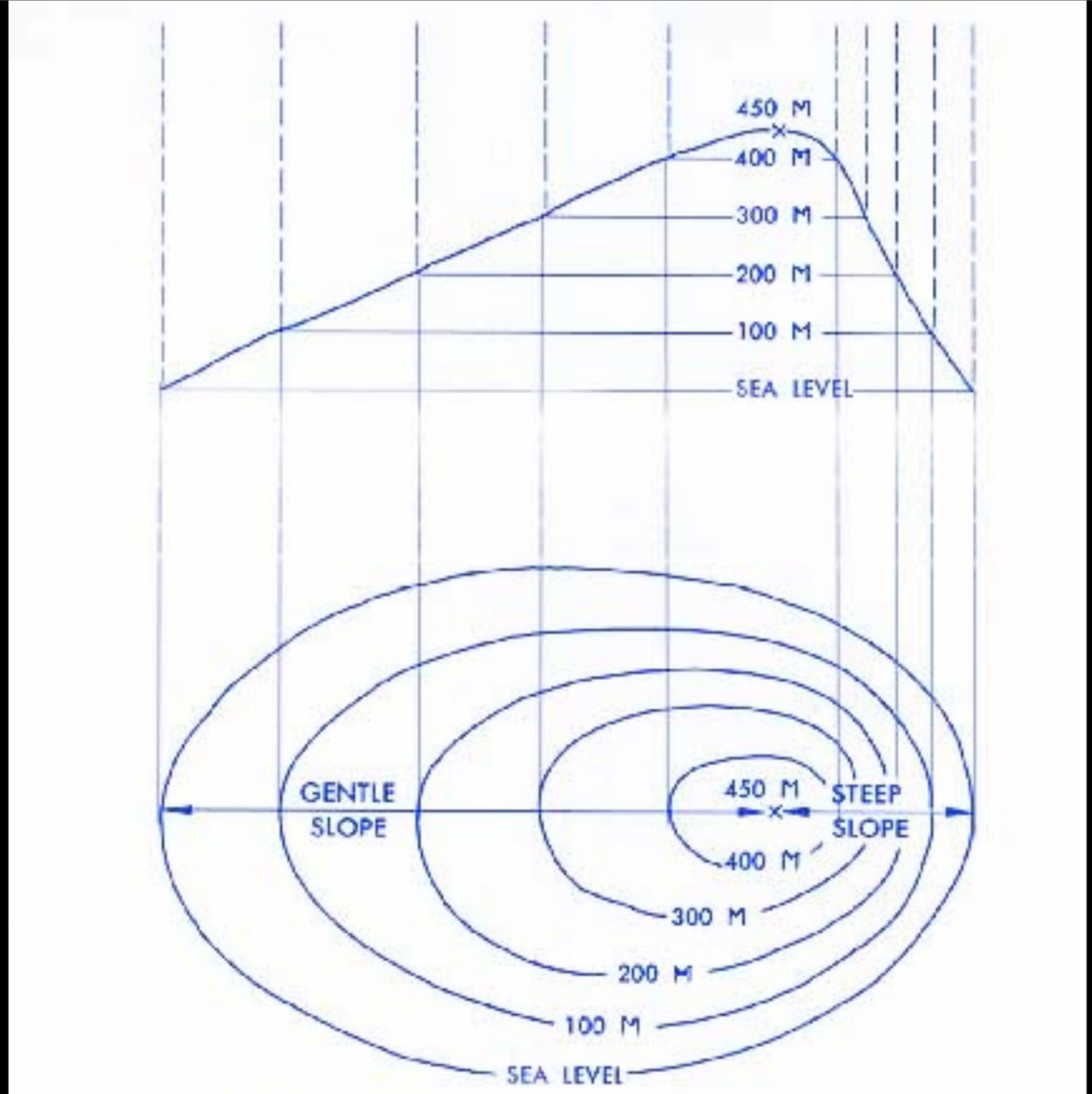
M. Topographic Profiles

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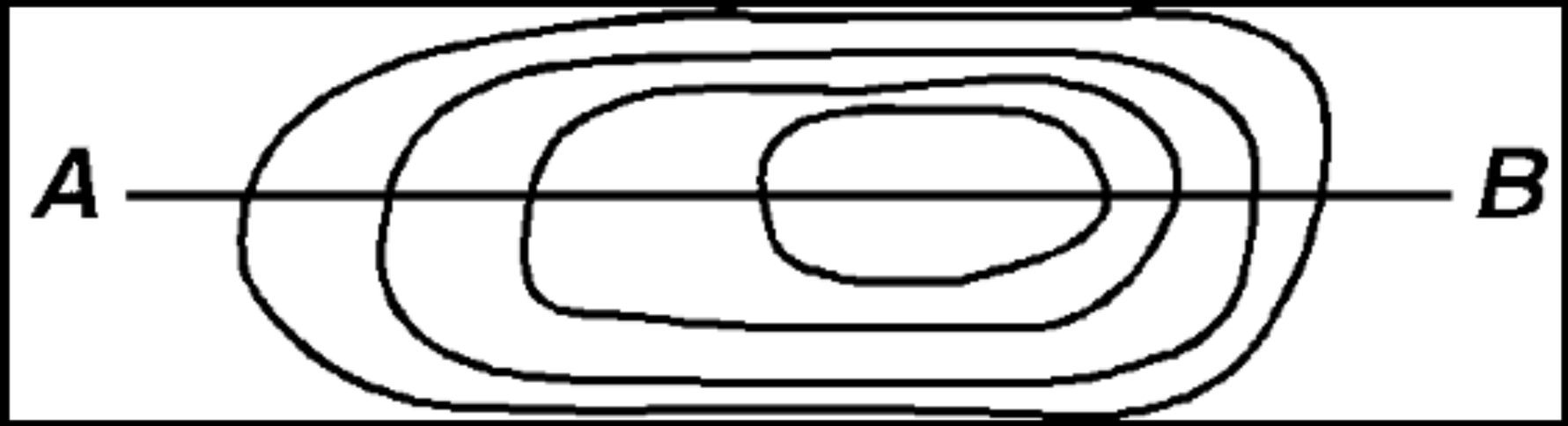


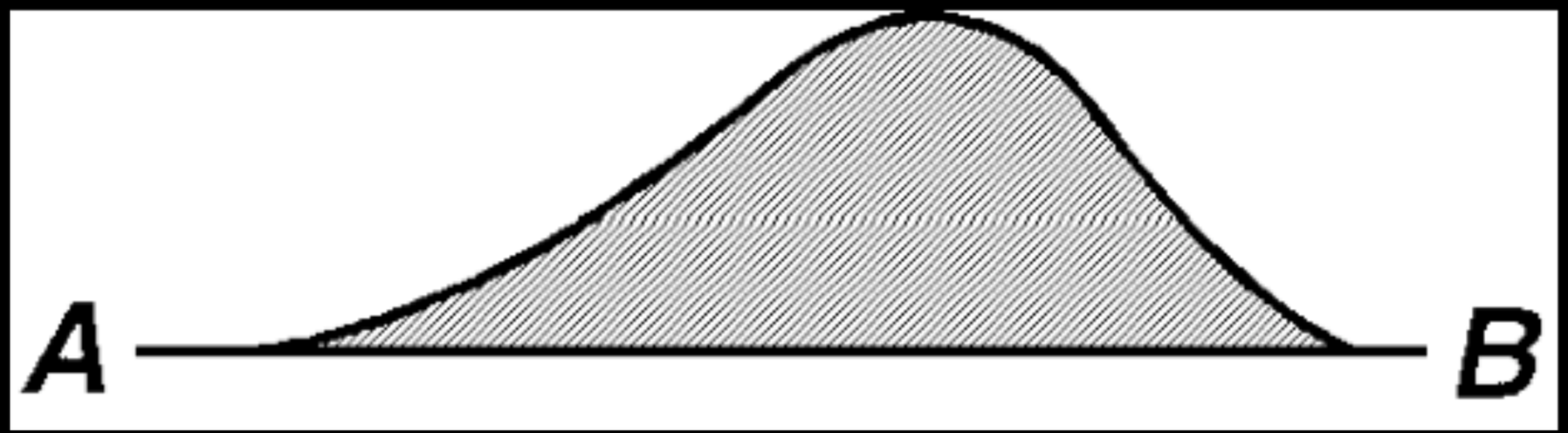


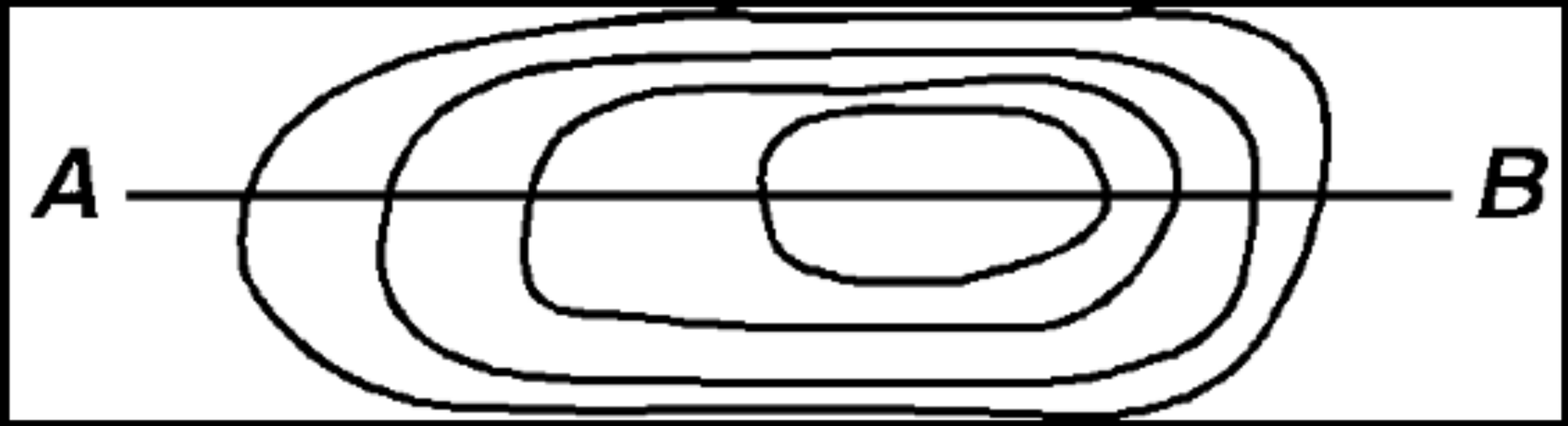
CONTOUR INTERVAL, 100 M

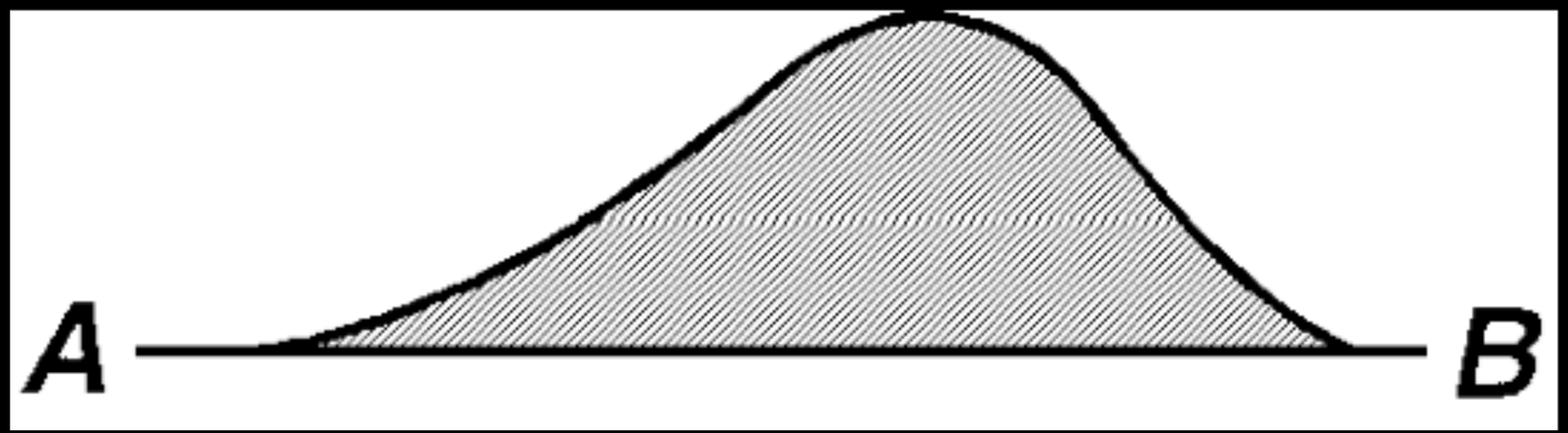


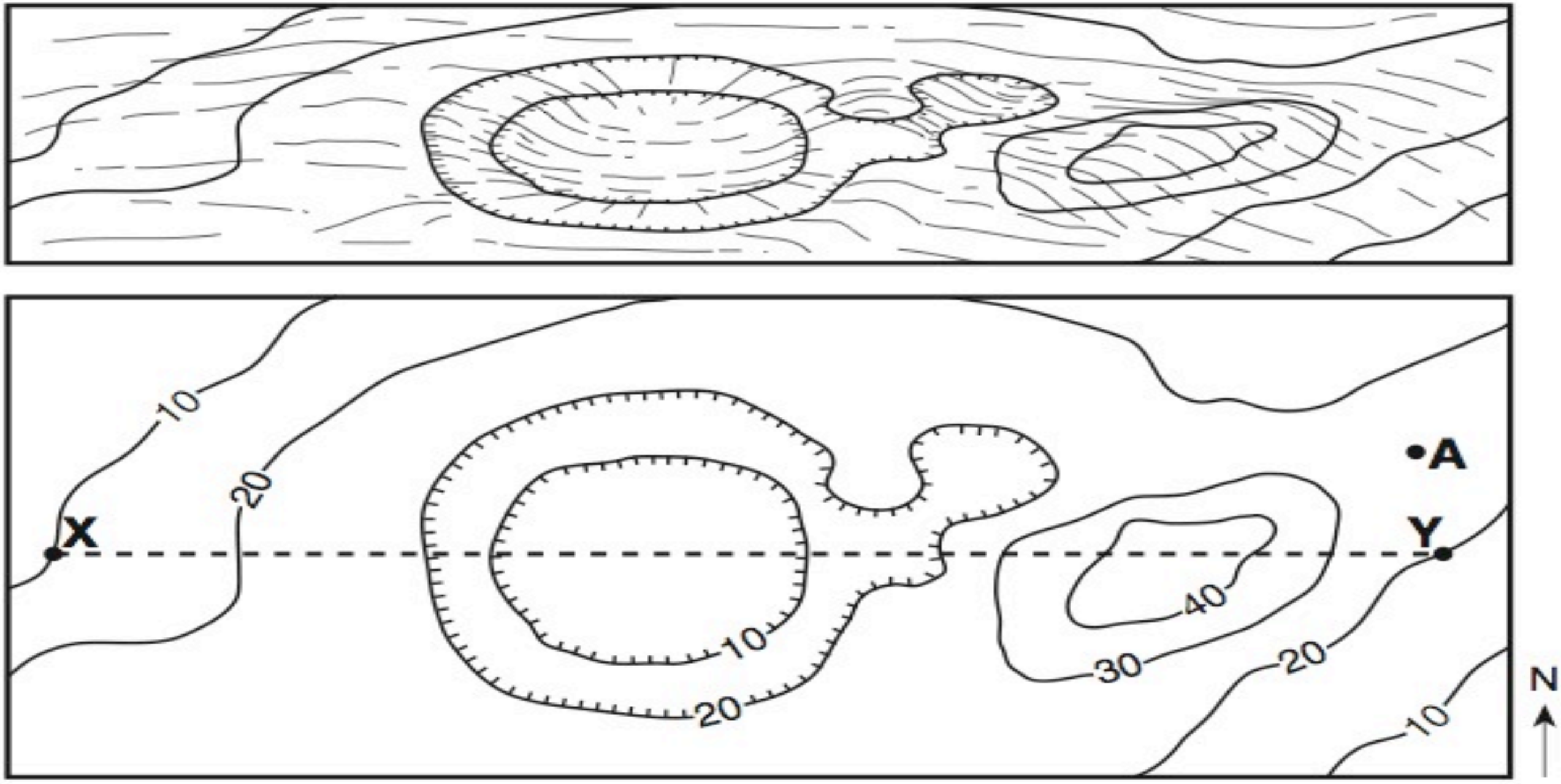
CONTOUR INTERVAL, 100 M


A
B


A
B

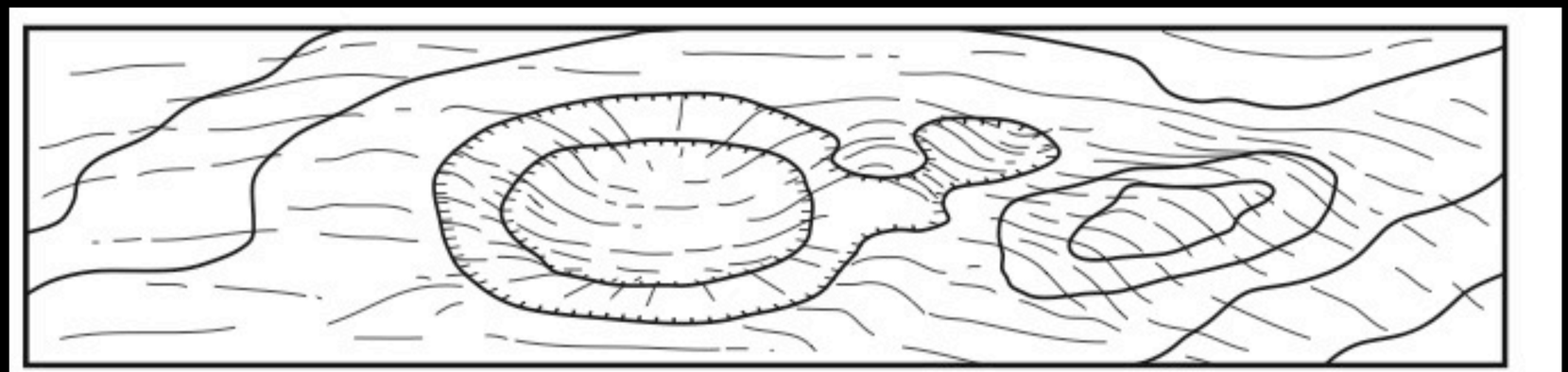

A
B

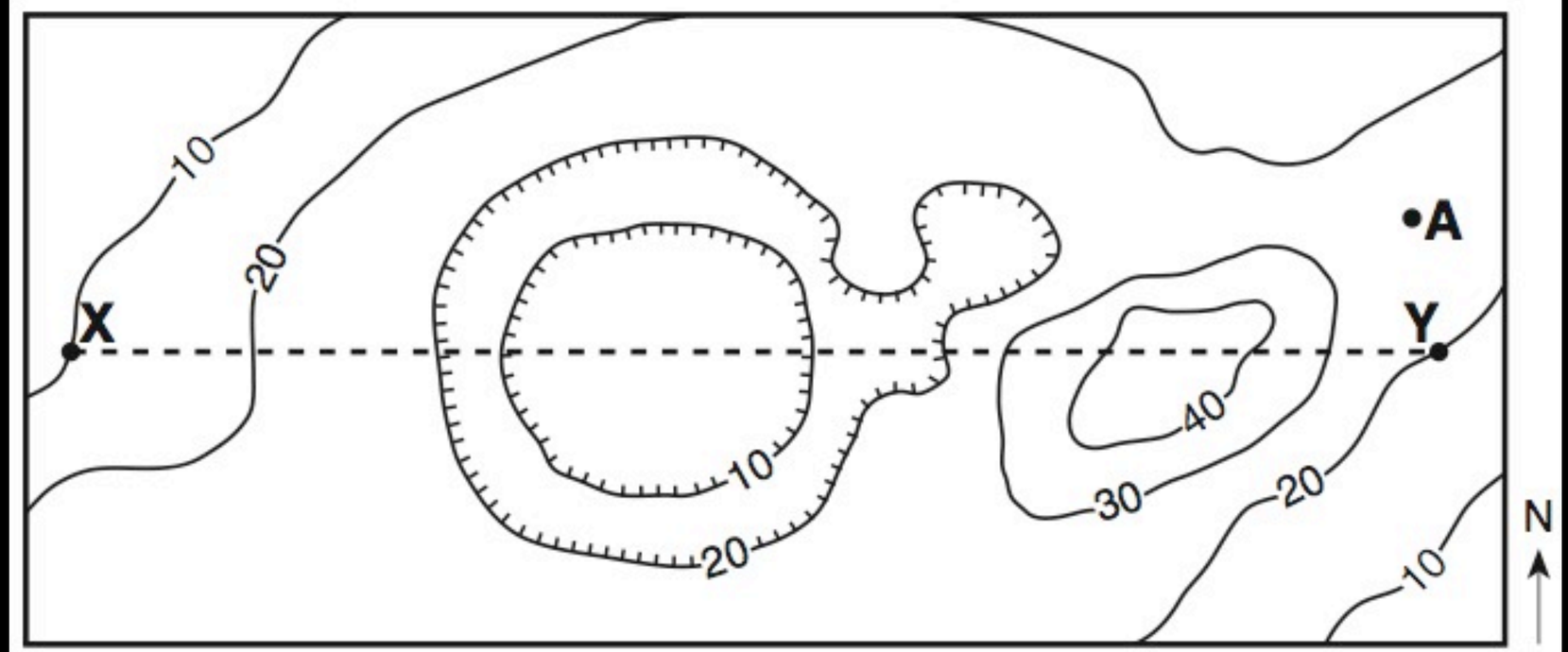

A
B


10
20
X
10
20
•A
Y
40
30
20
10
N

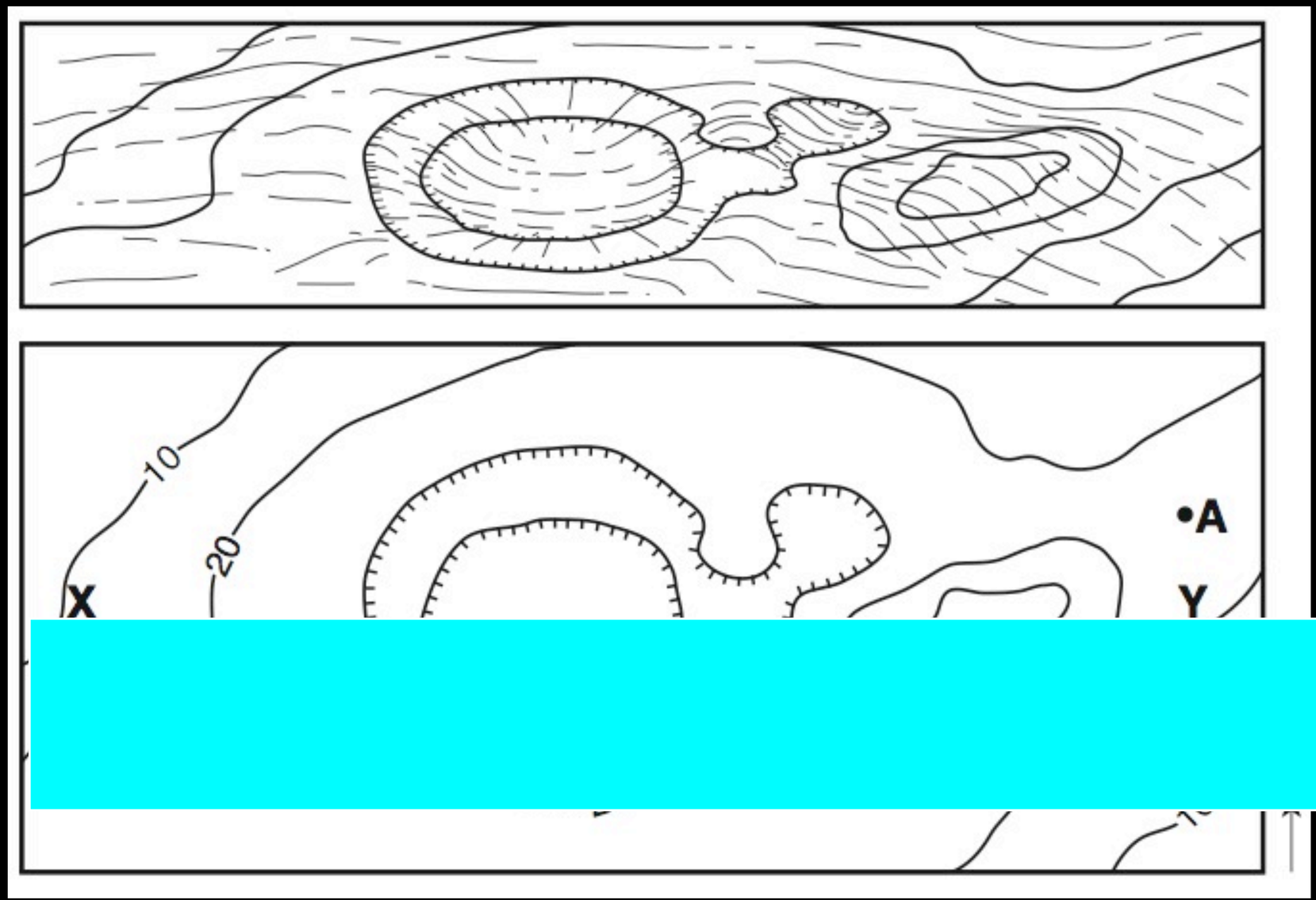
How to Draw a Topographic Profile

How to Draw a Topographic Profile

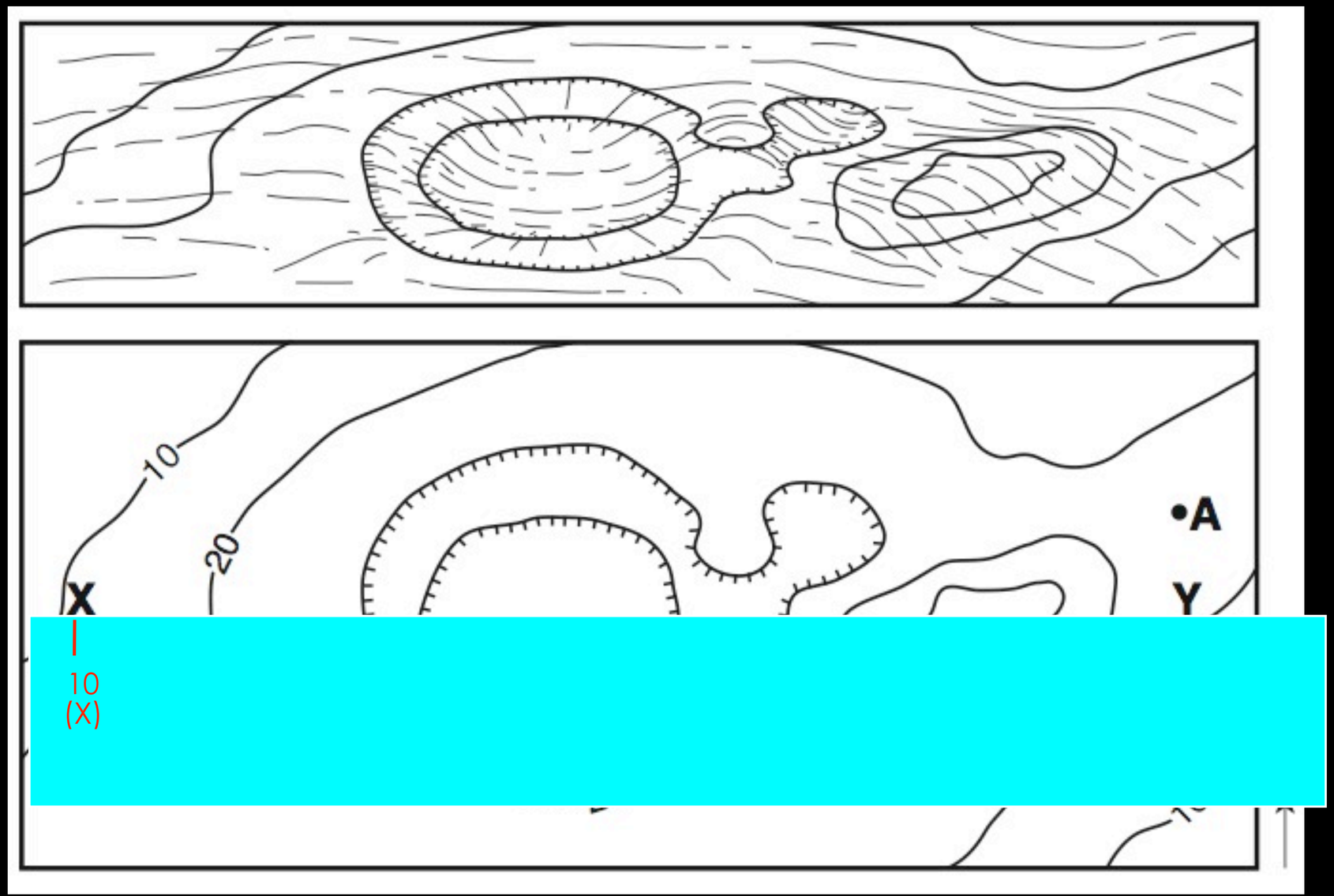




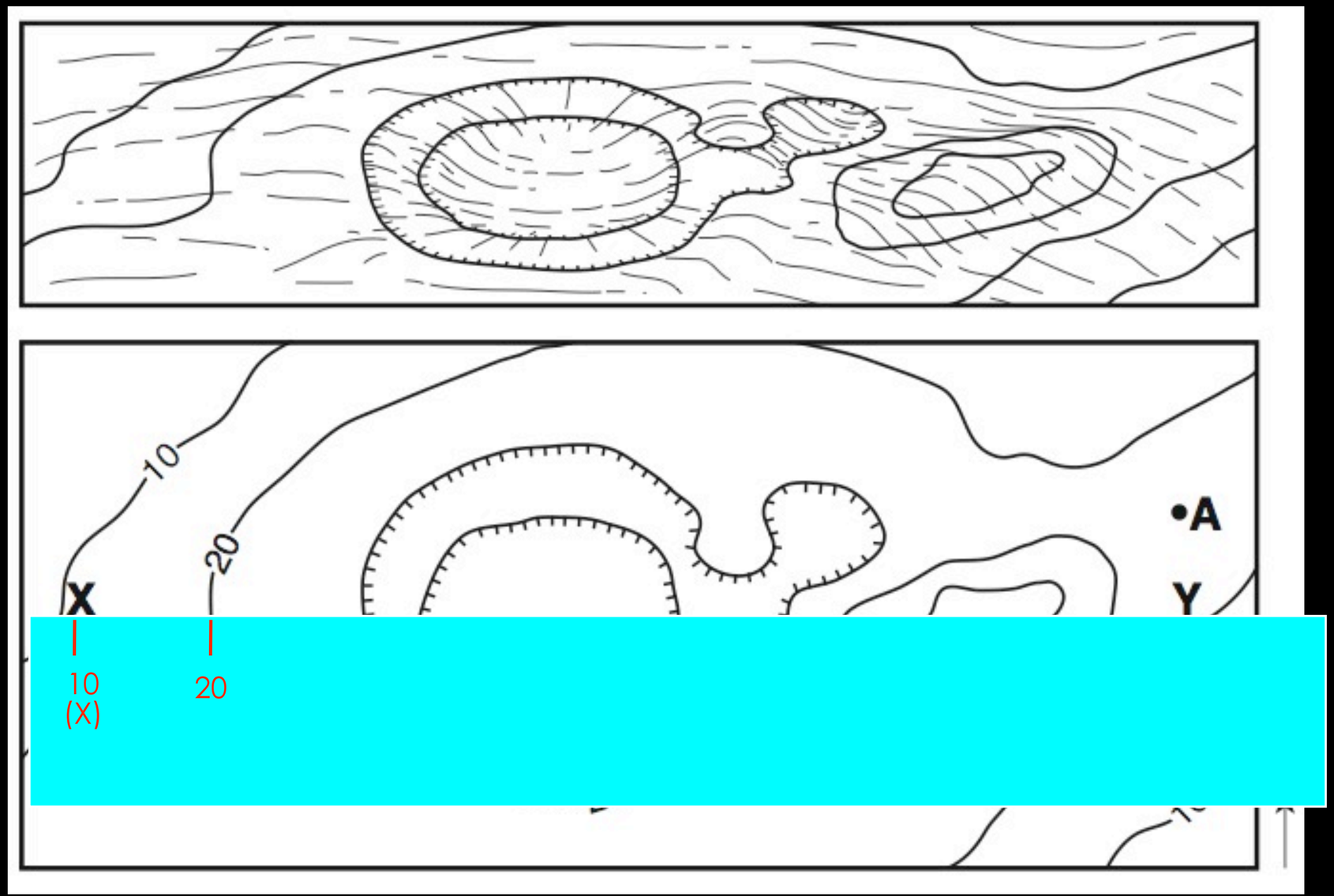
How to Draw a Topographic Profile



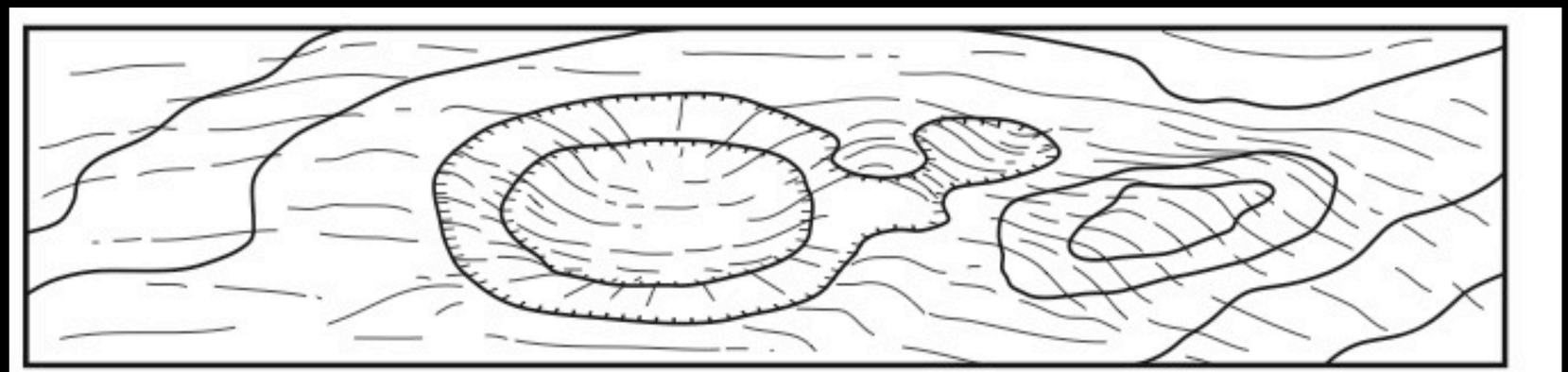
How to Draw a Topographic Profile

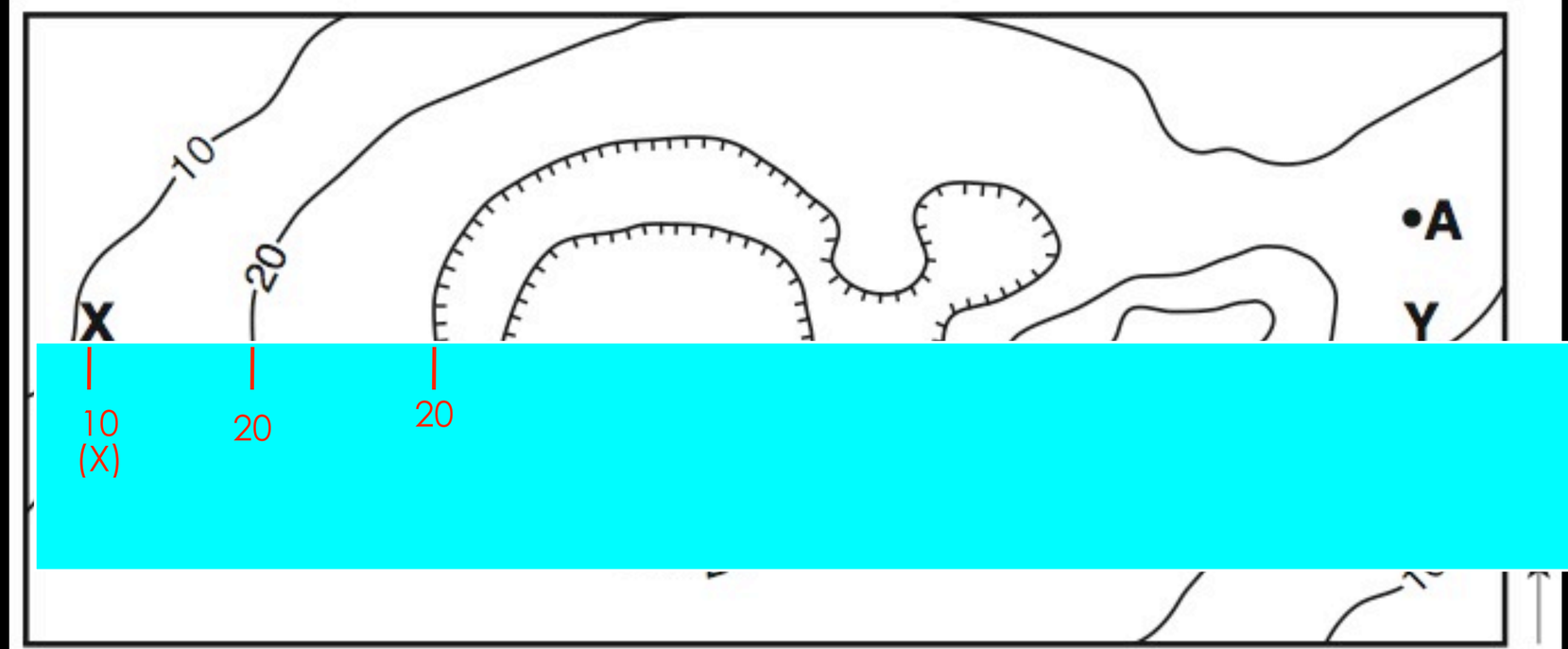


How to Draw a Topographic Profile

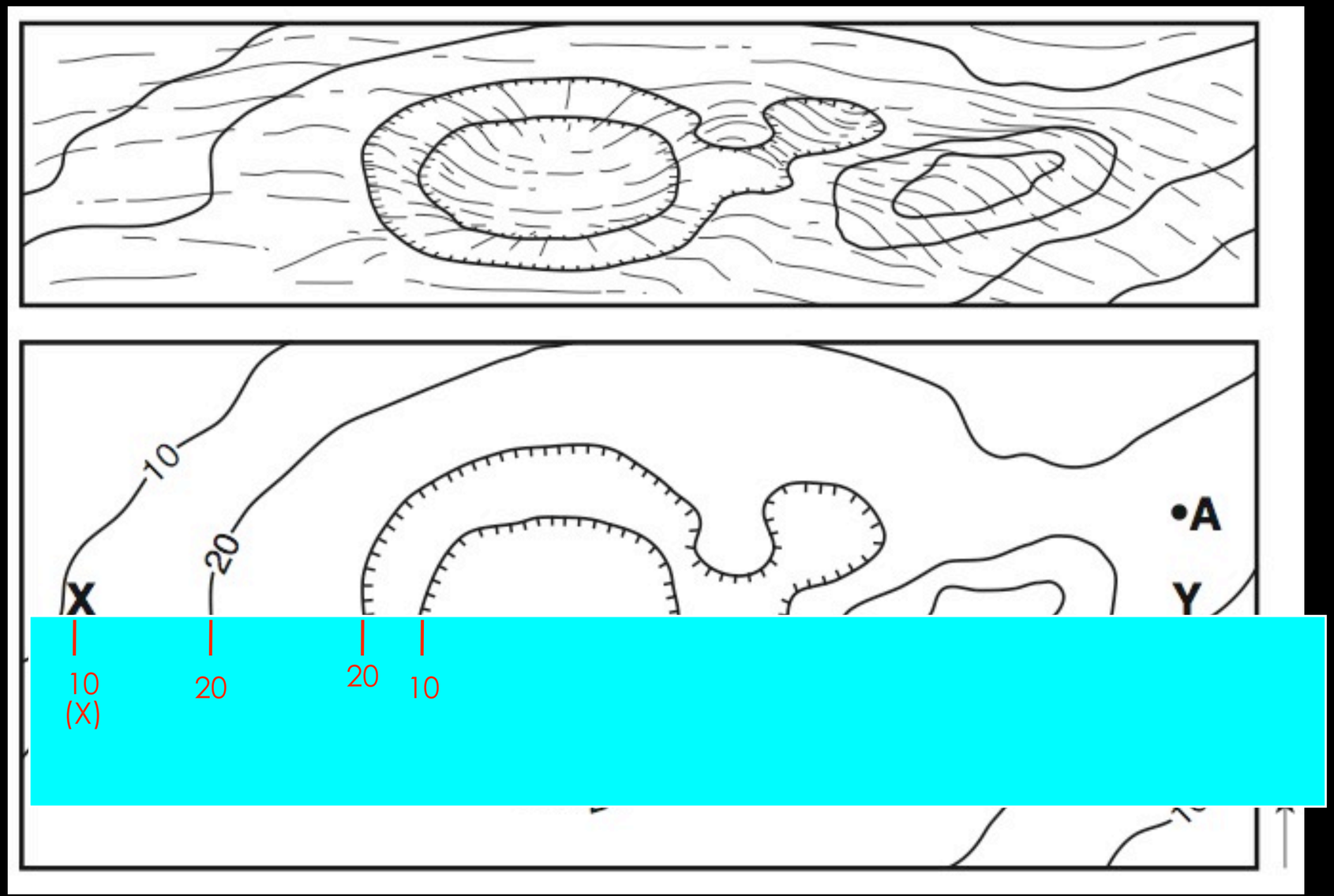


How to Draw a Topographic Profile

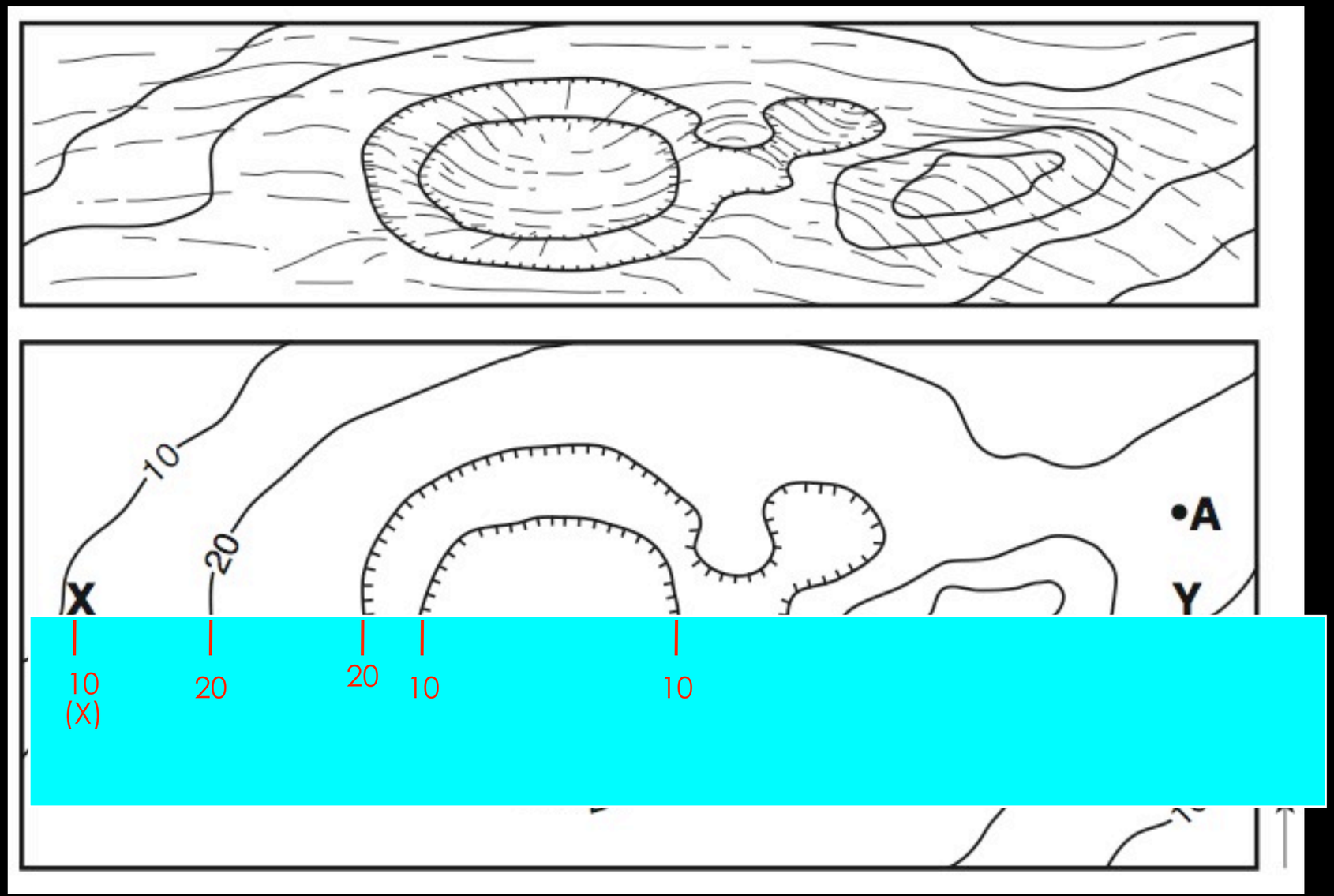




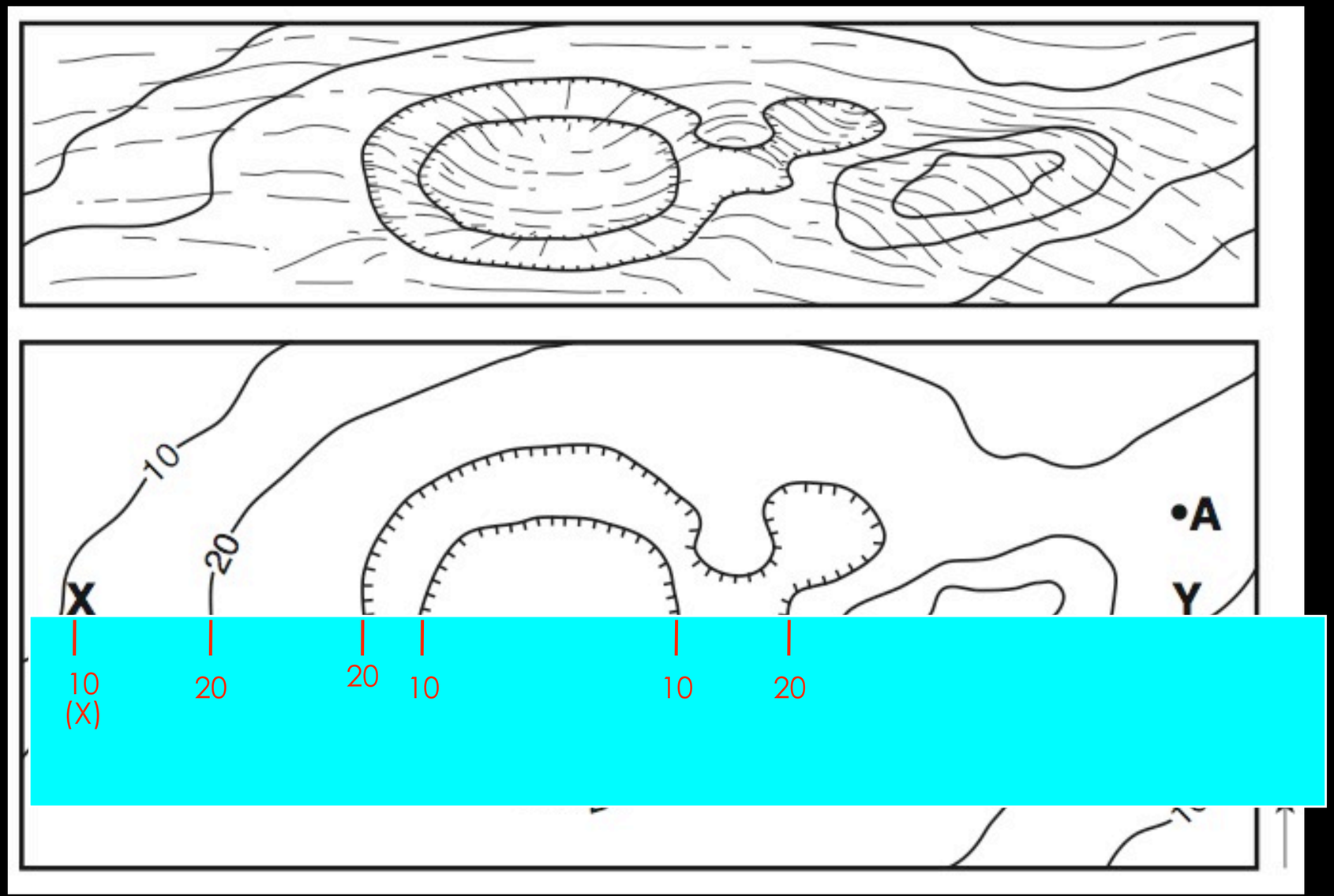
How to Draw a Topographic Profile



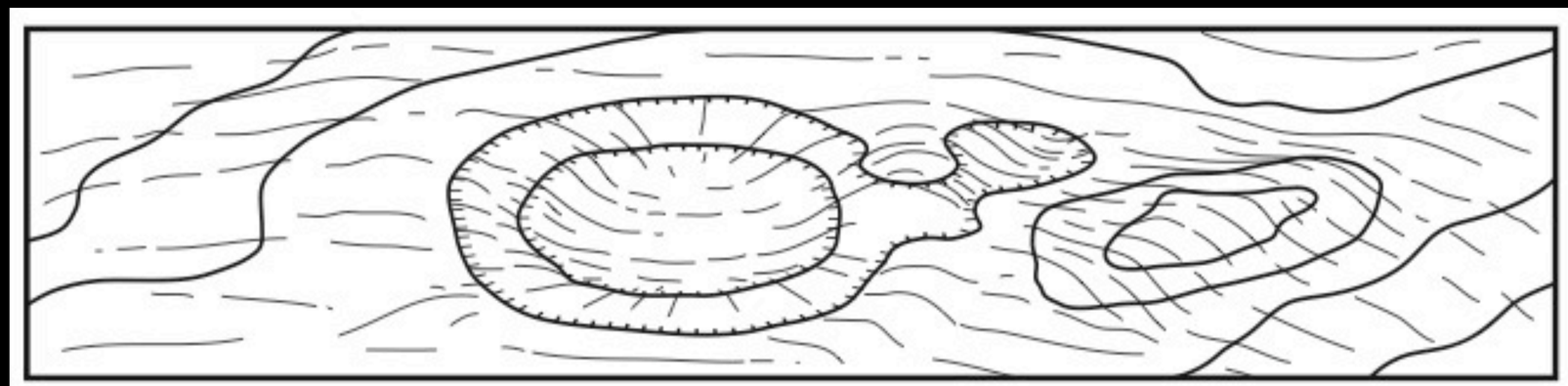
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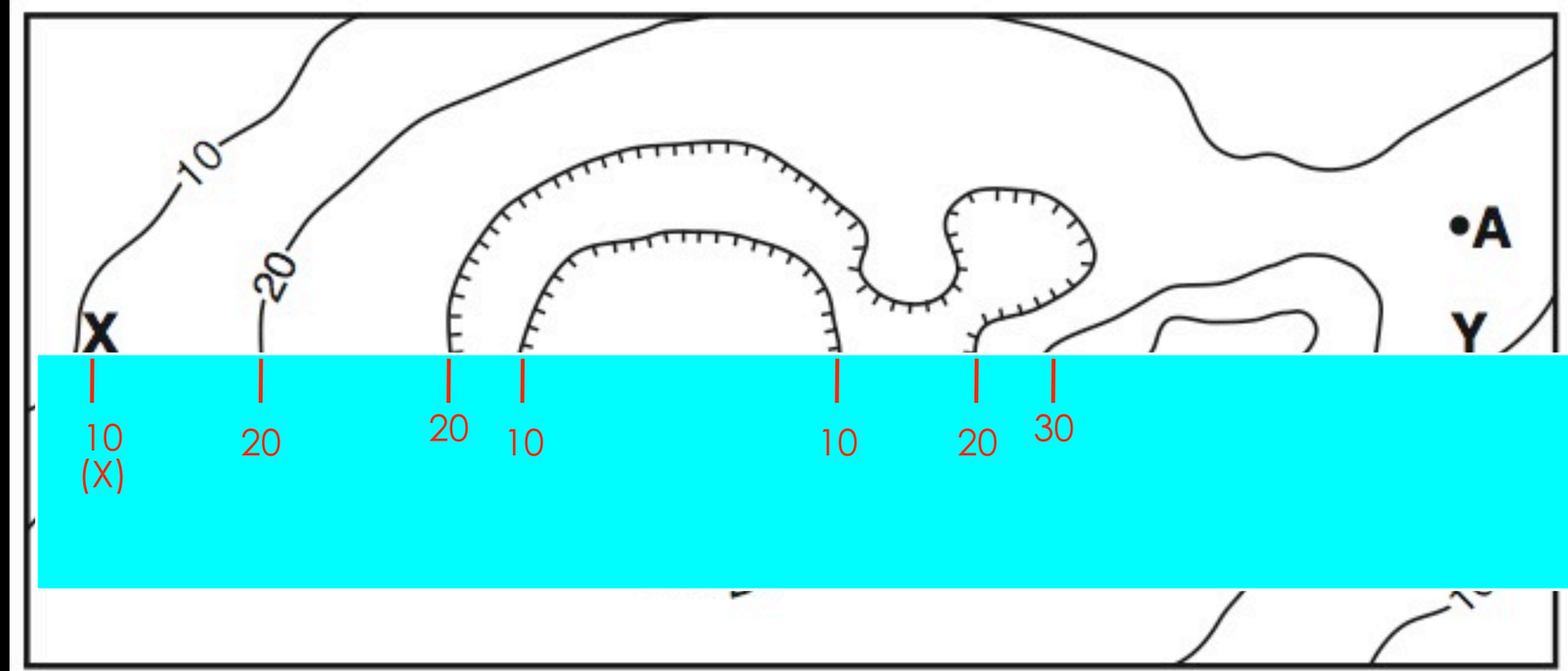


How to Draw a Topographic Profile

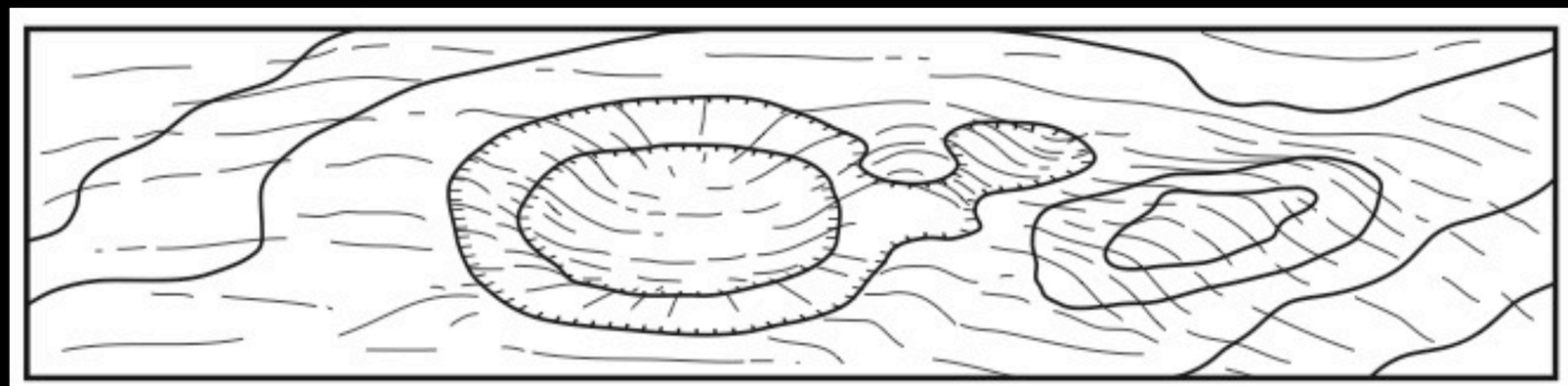


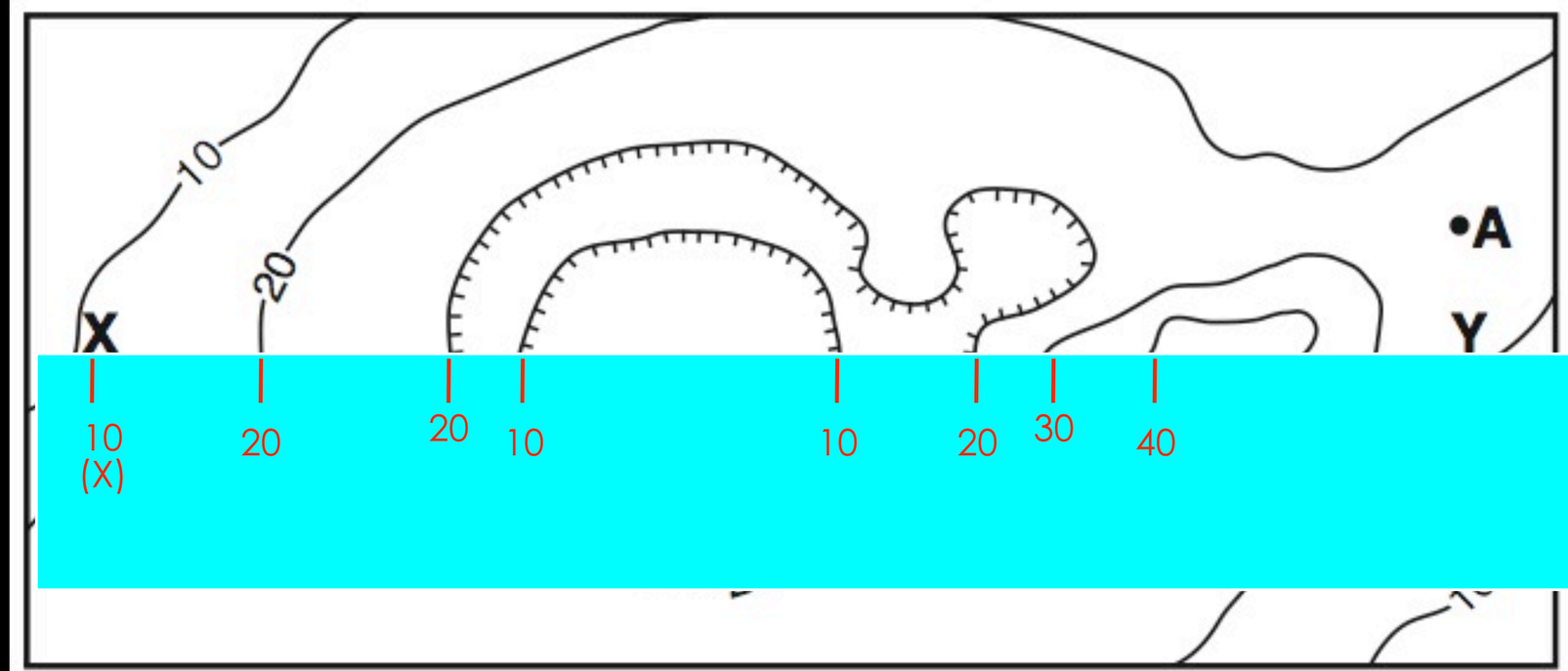
How to Draw a Topographic Profile



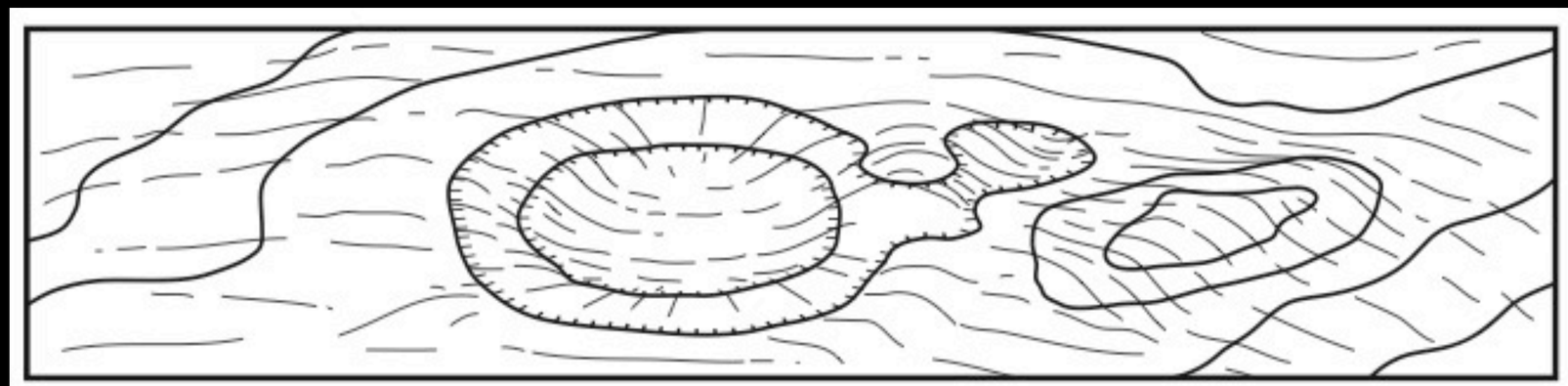


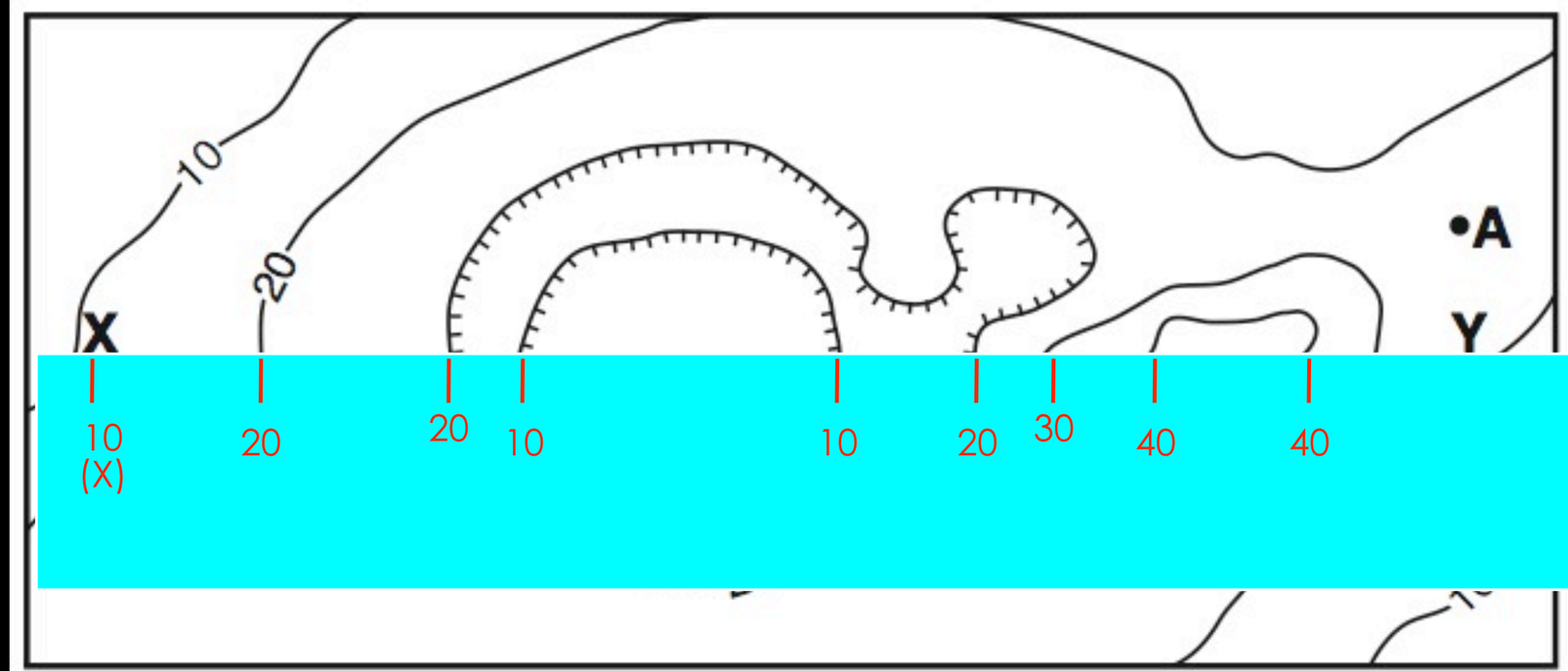
How to Draw a Topographic Profile



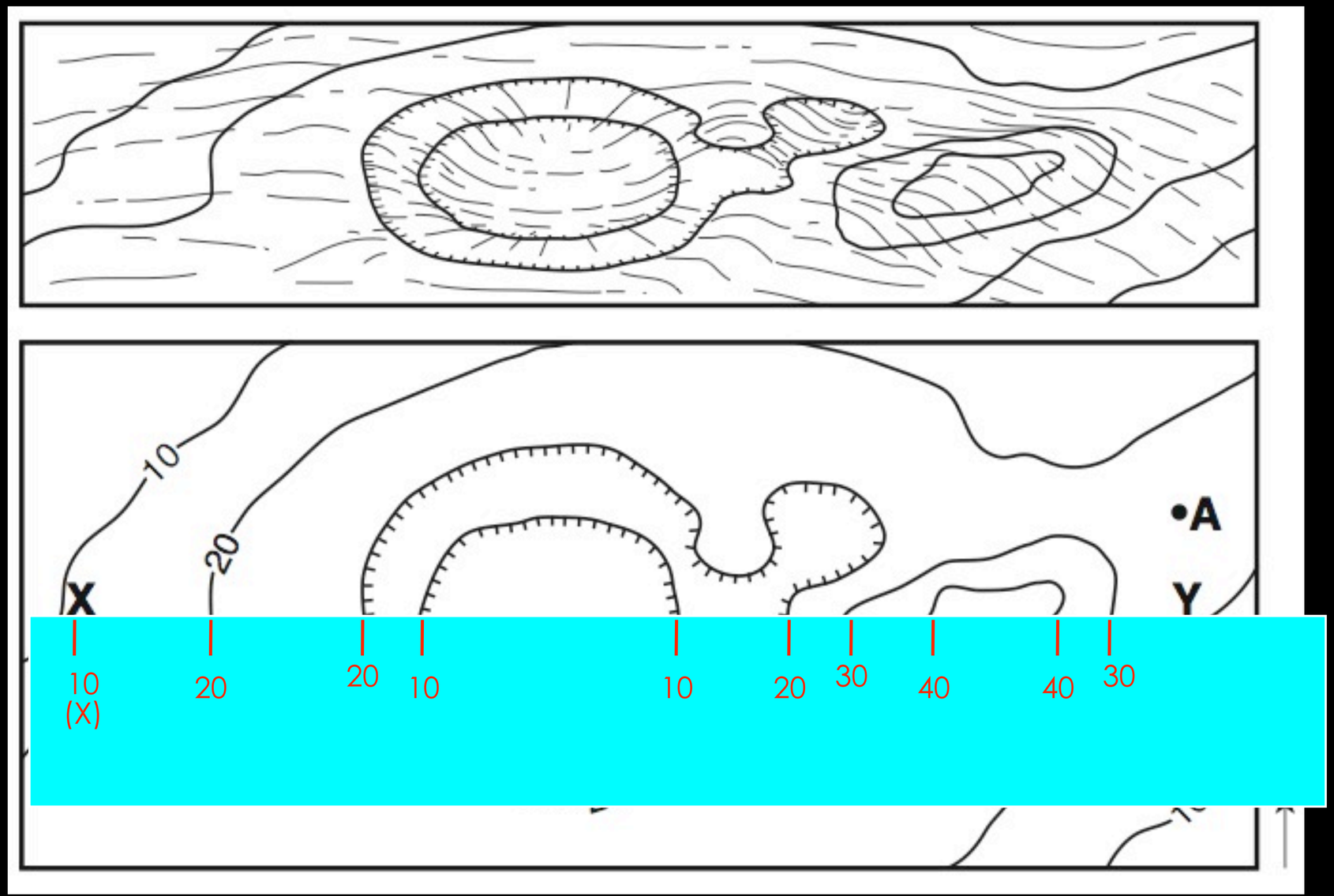


How to Draw a Topographic Profile

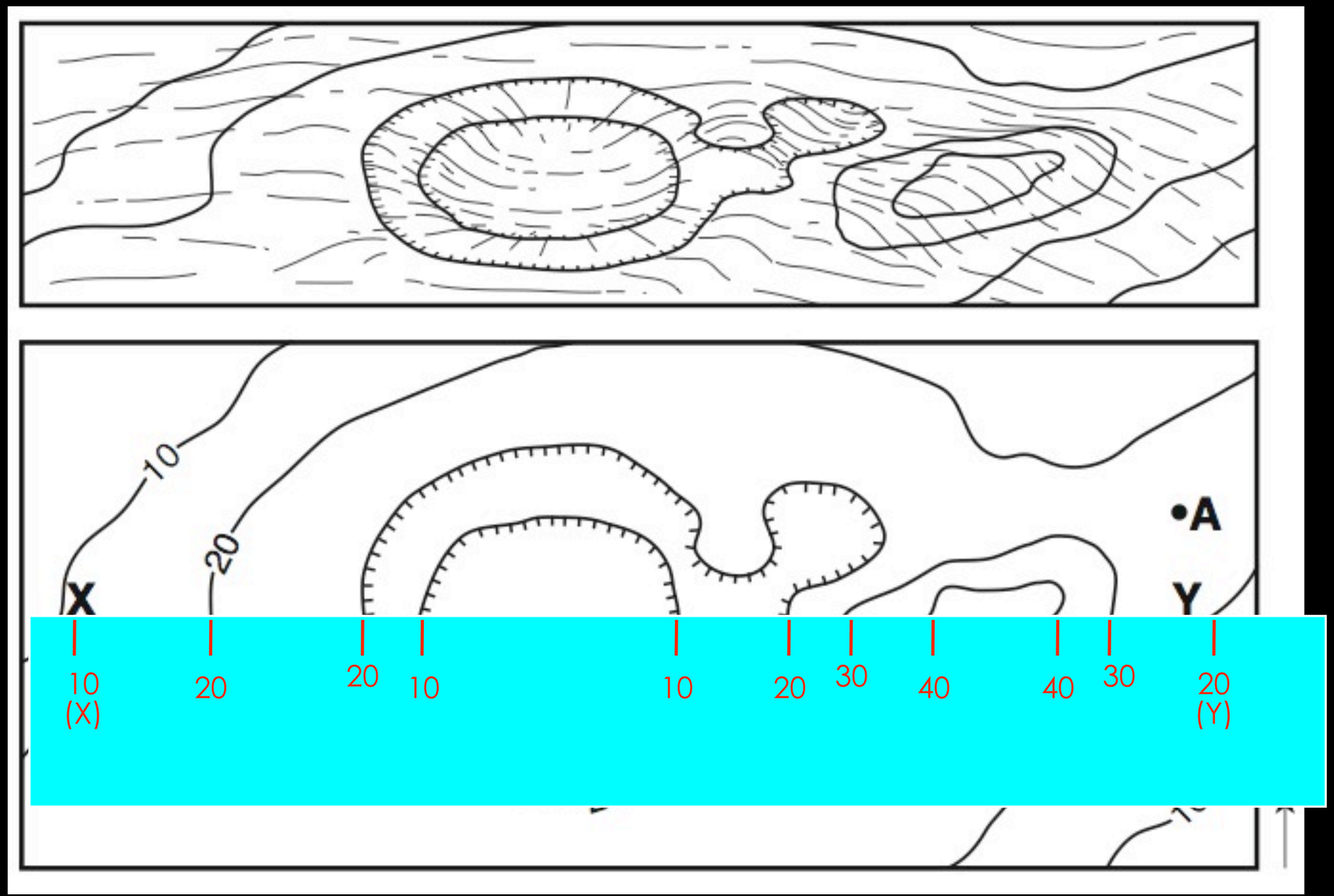




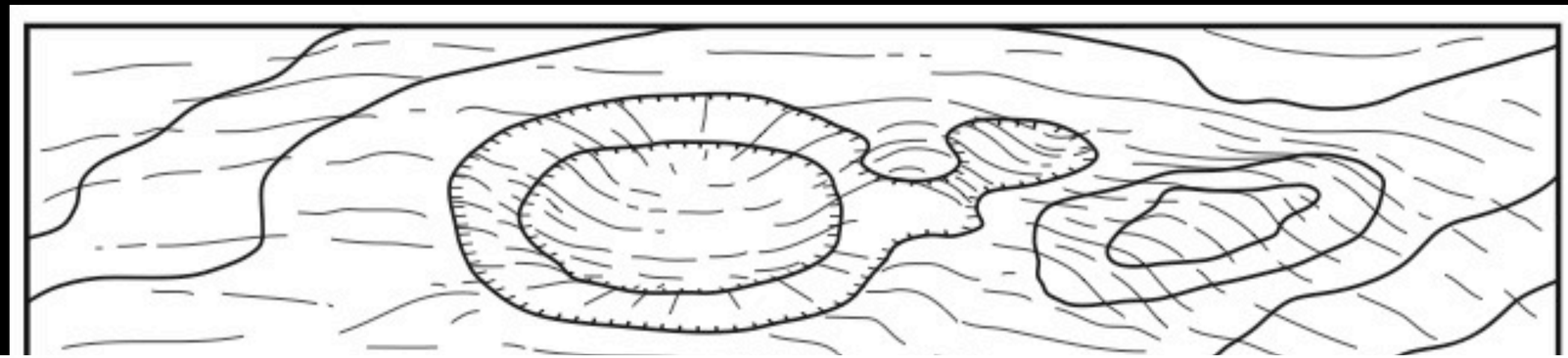
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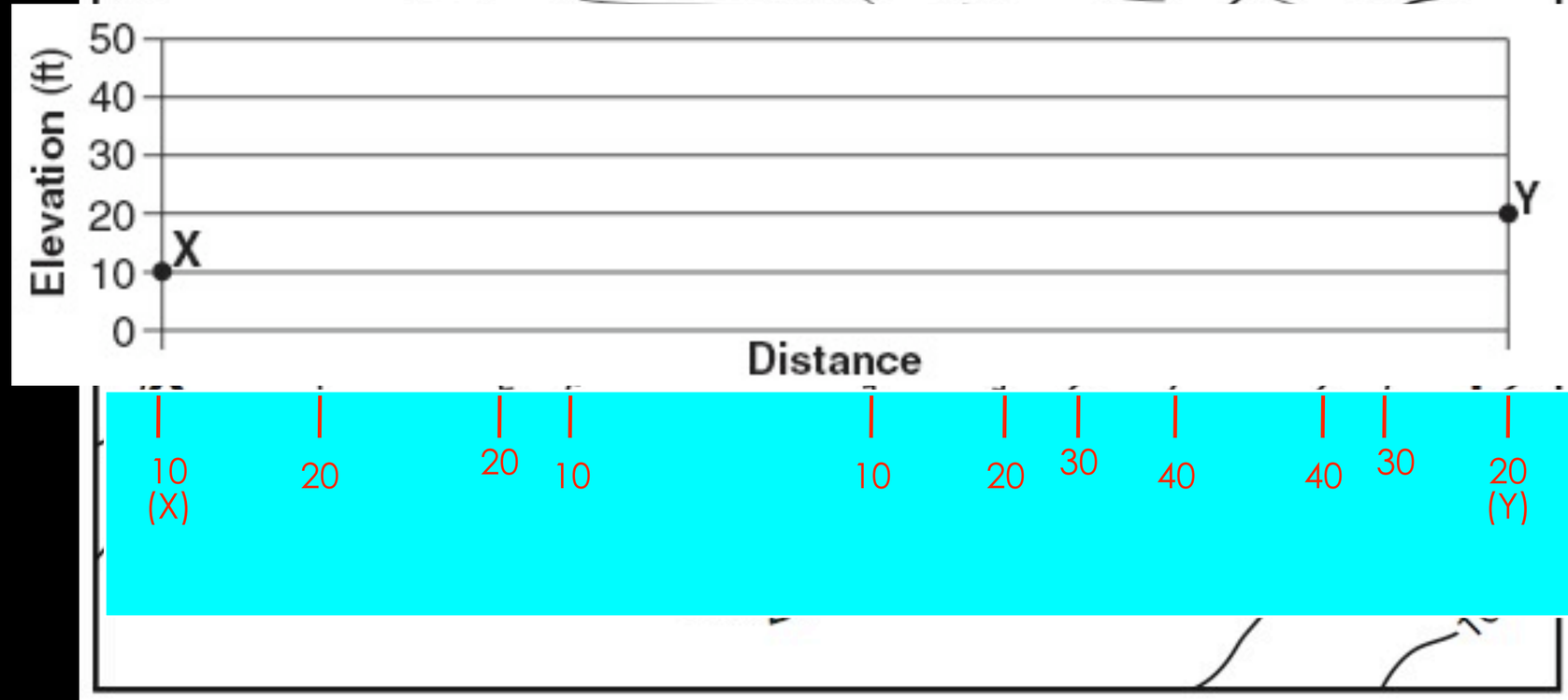


How to Draw a Topographic Profile

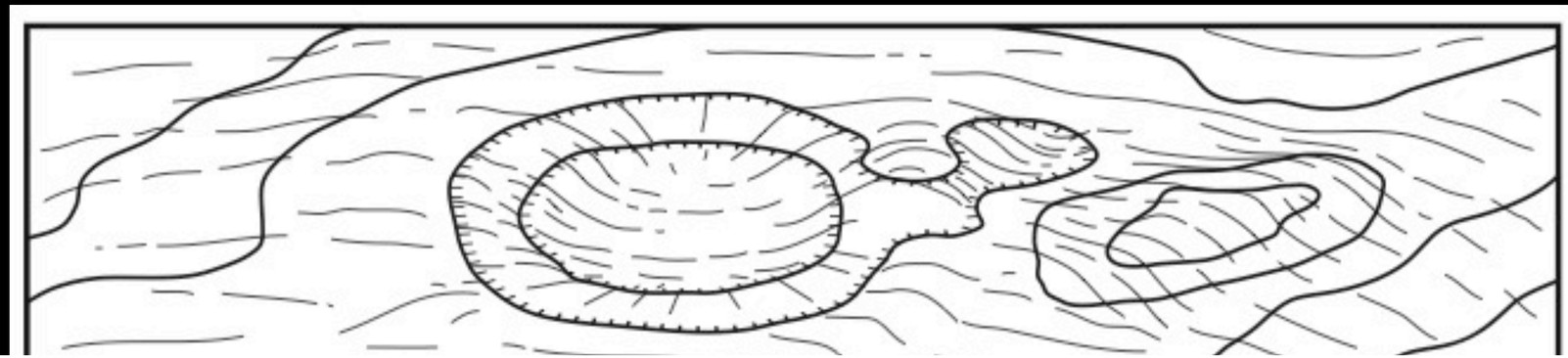


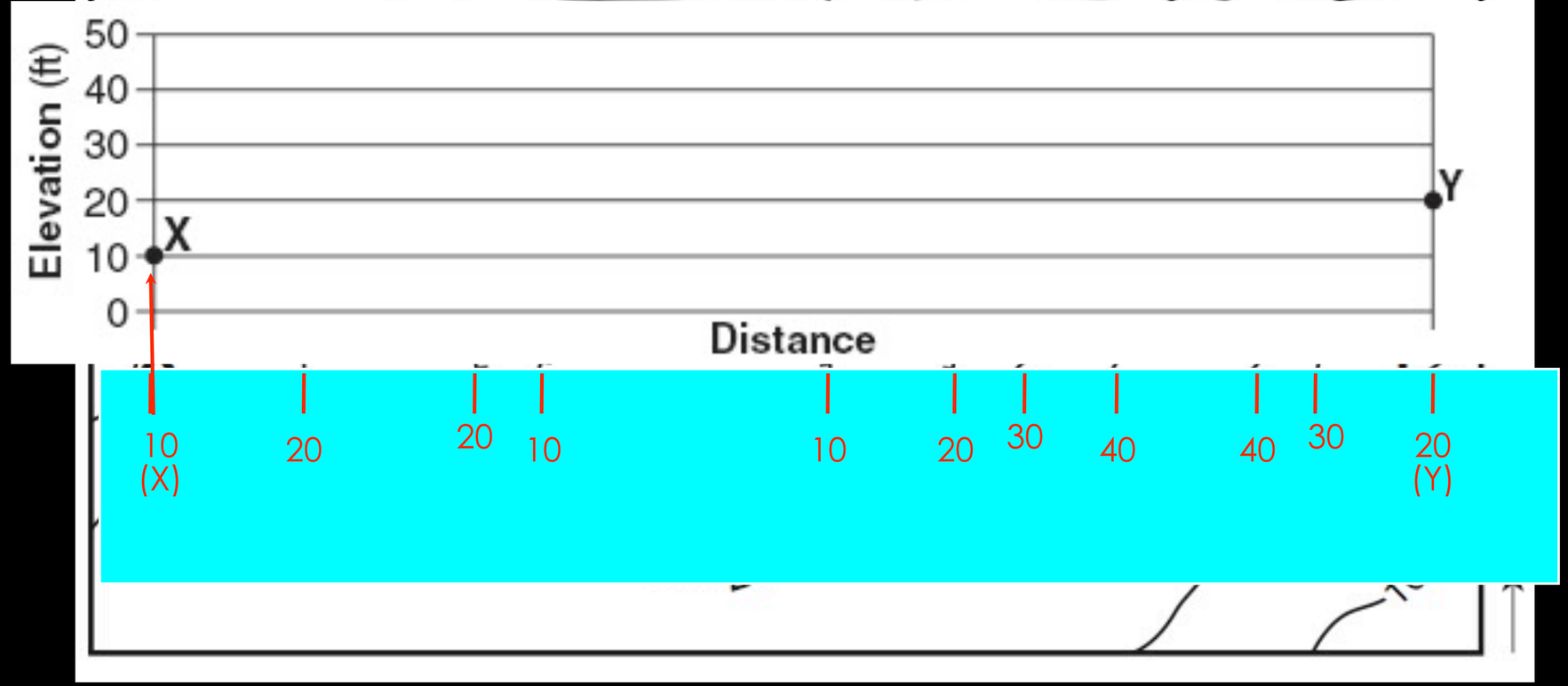
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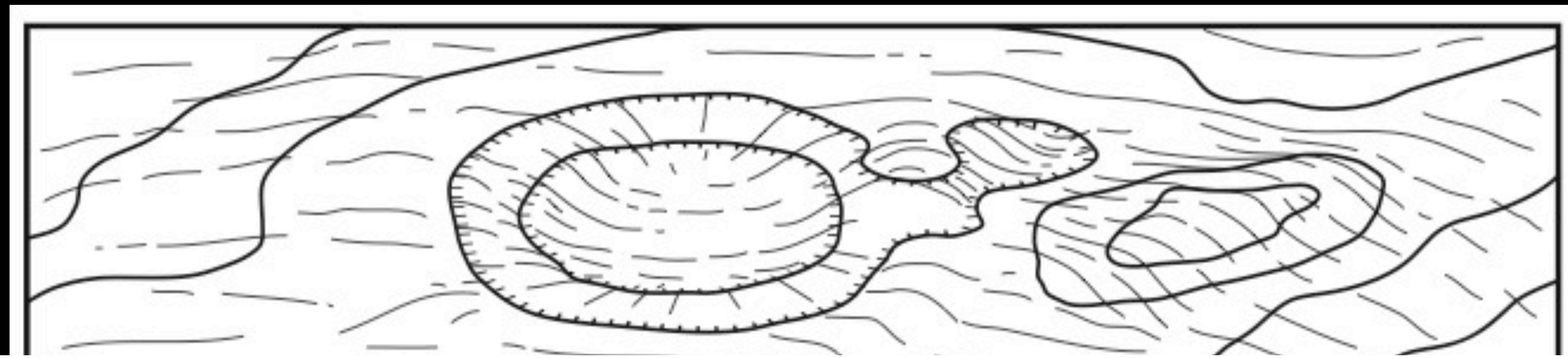


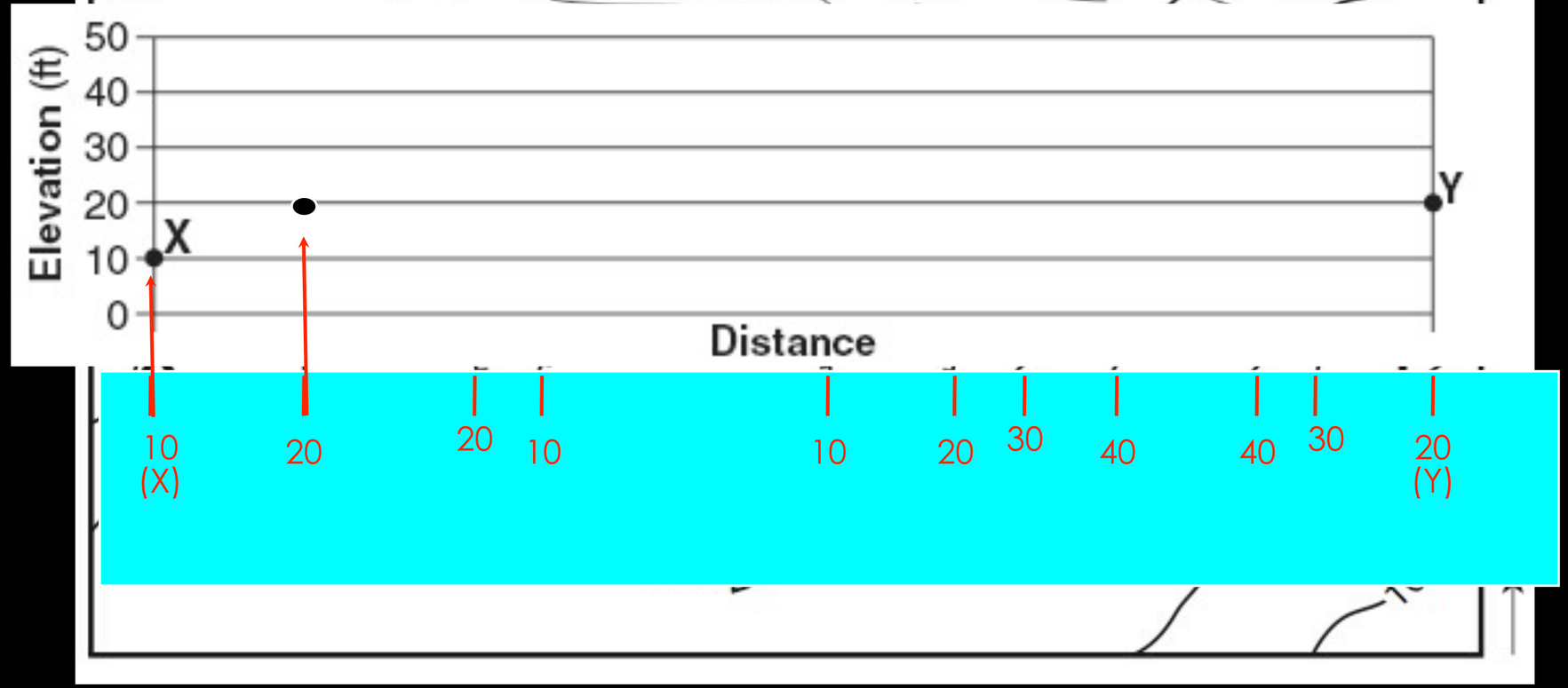
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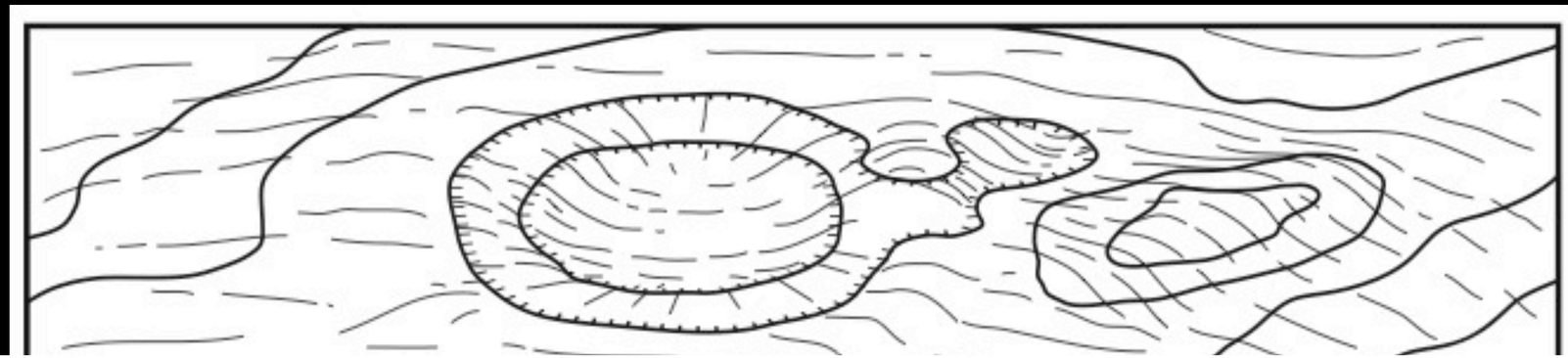


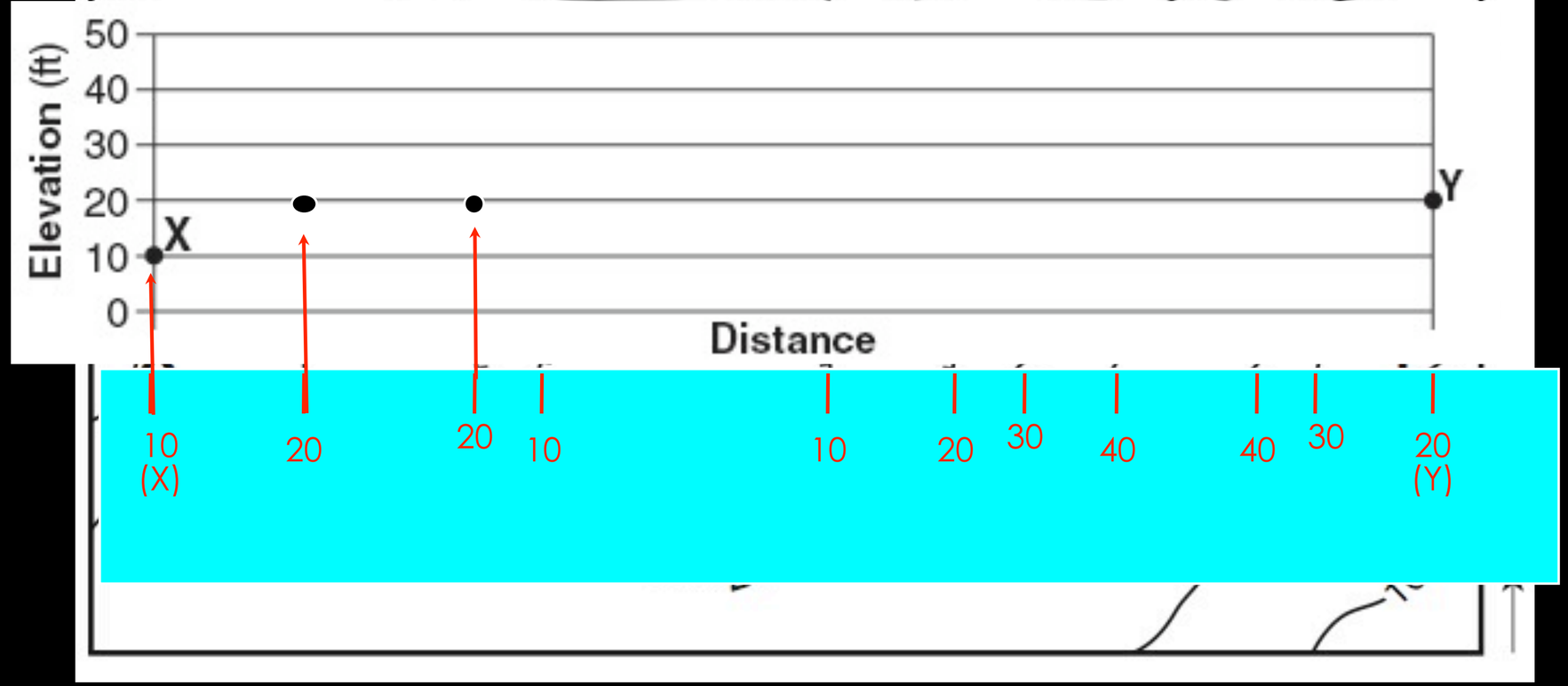
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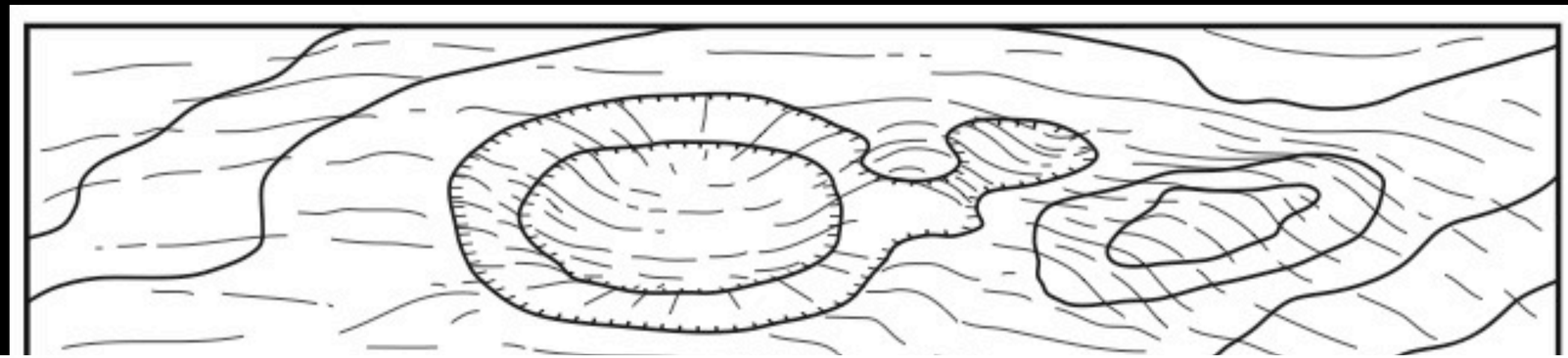


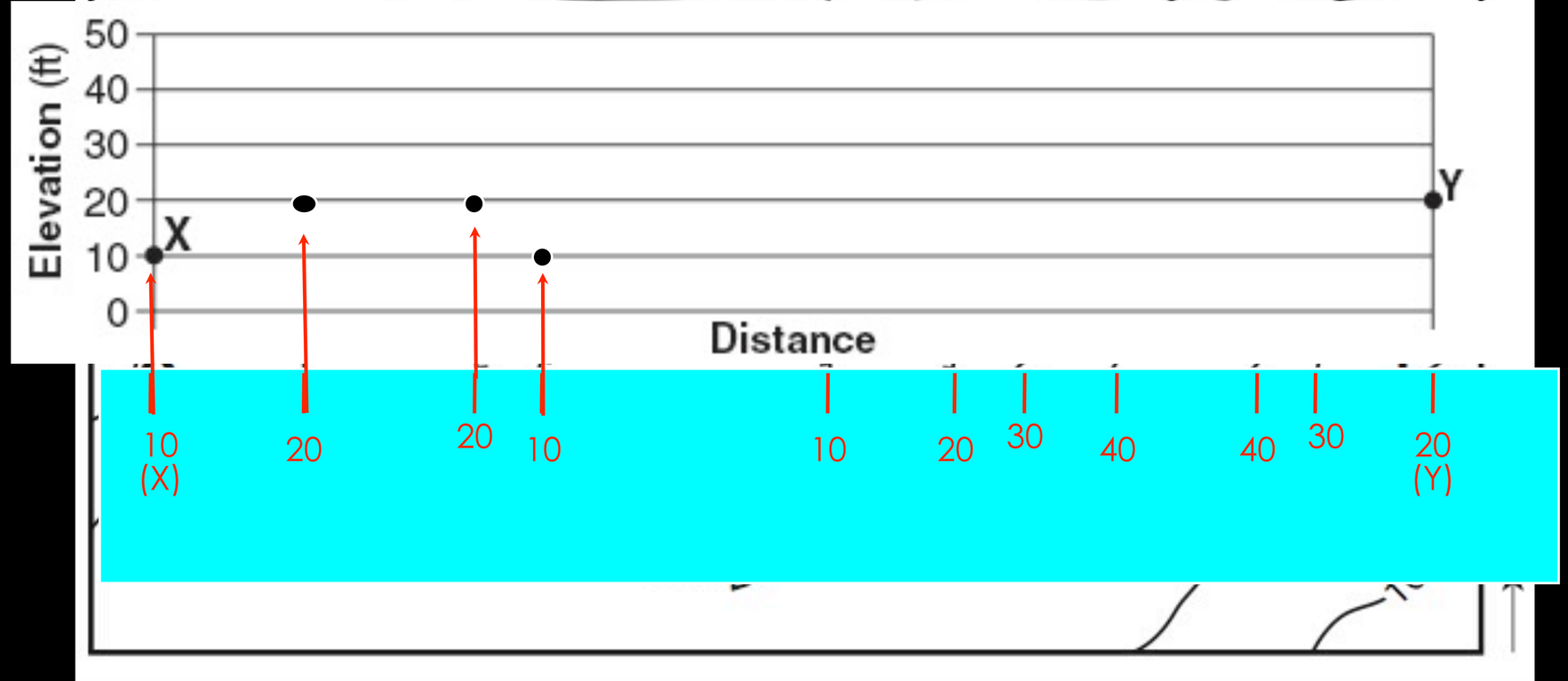
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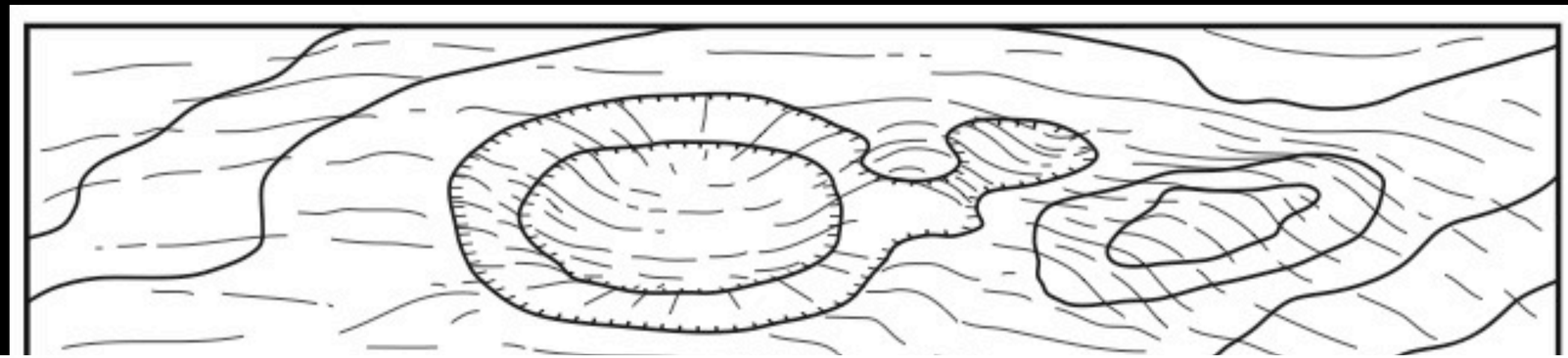


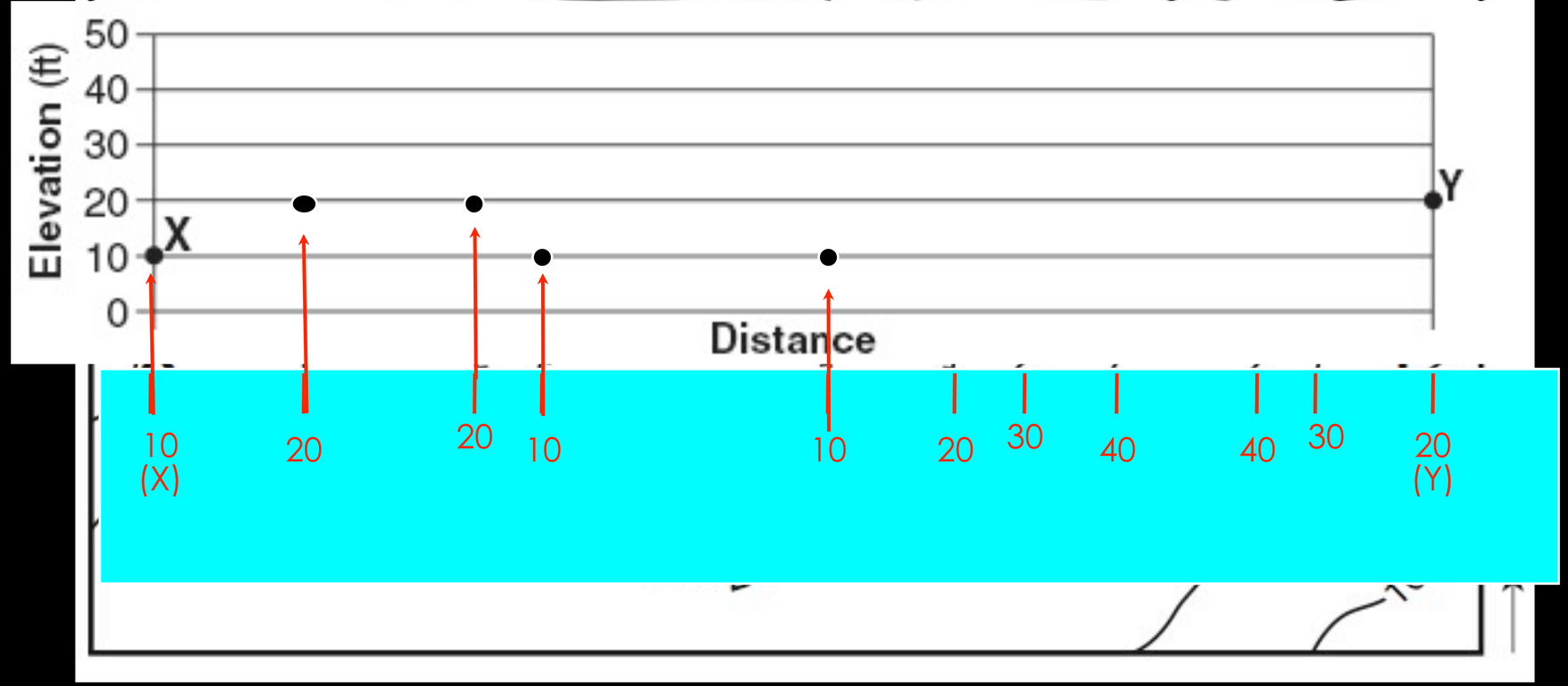
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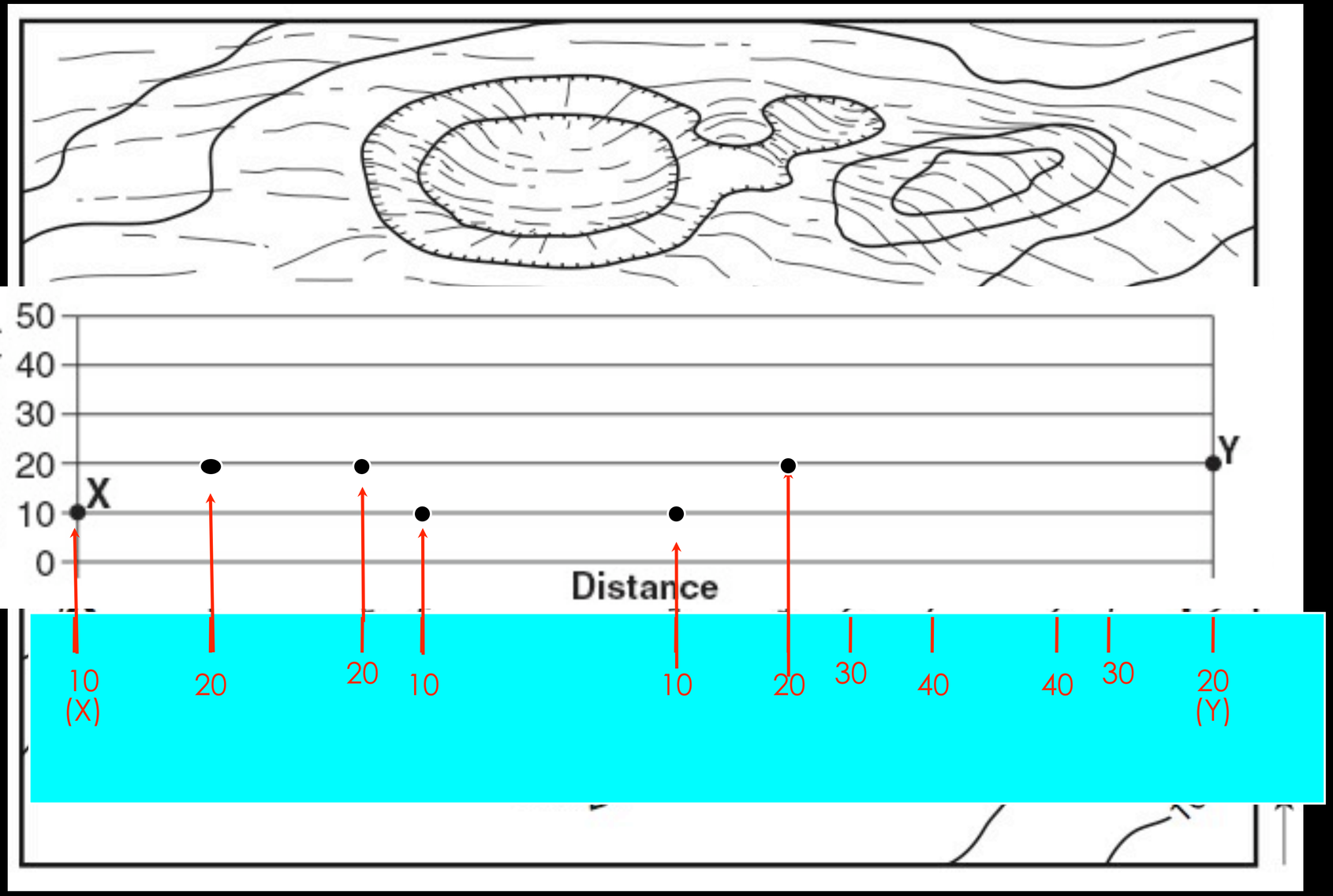


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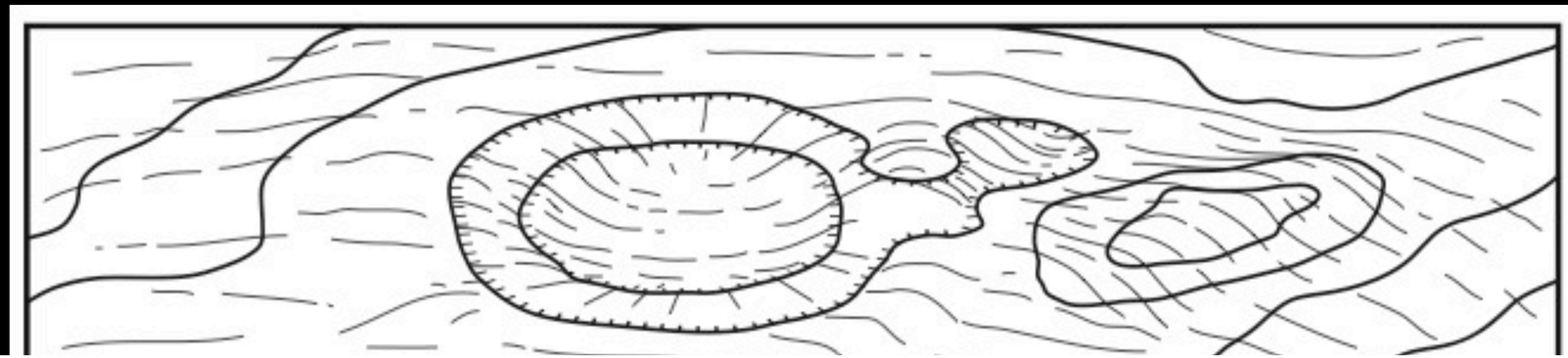


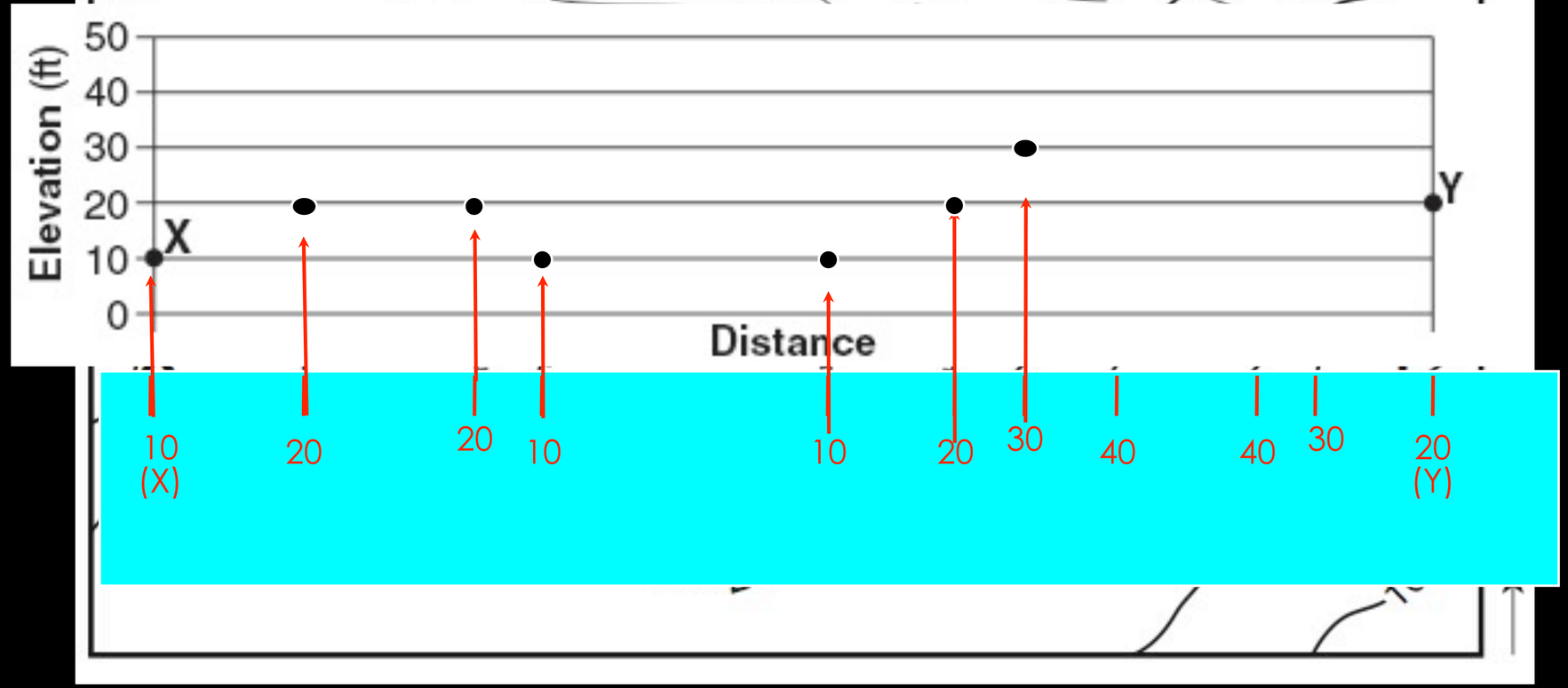


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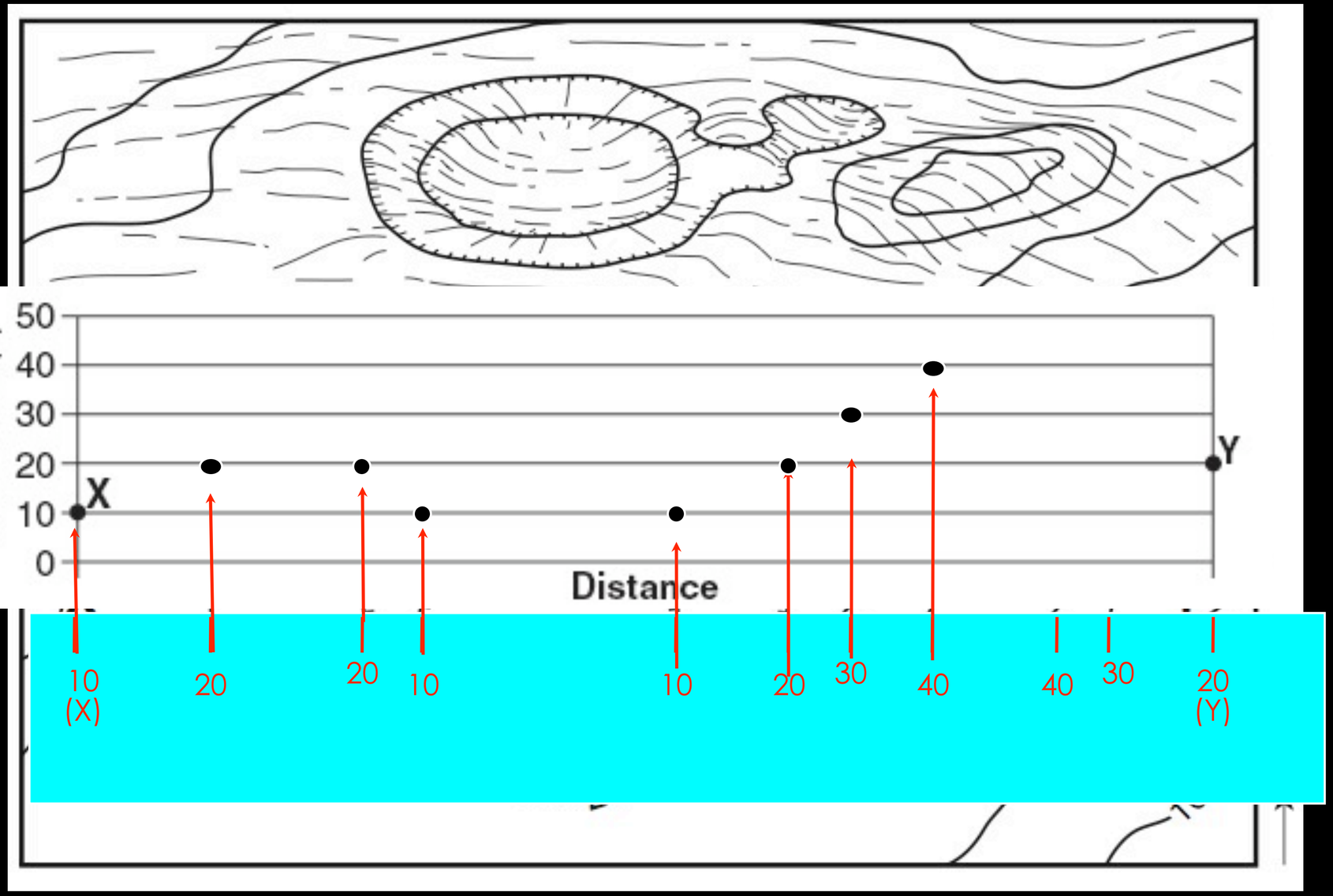


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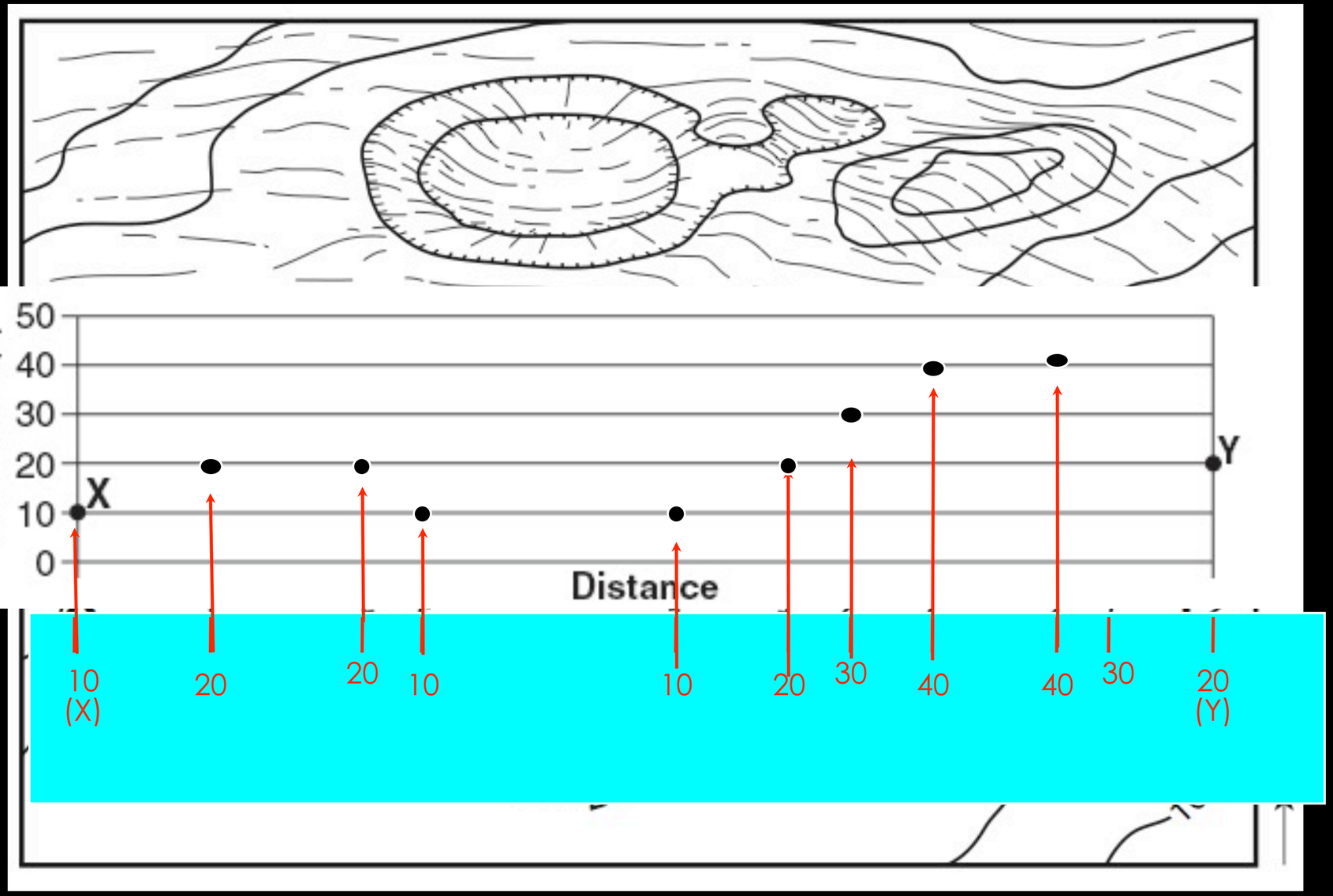




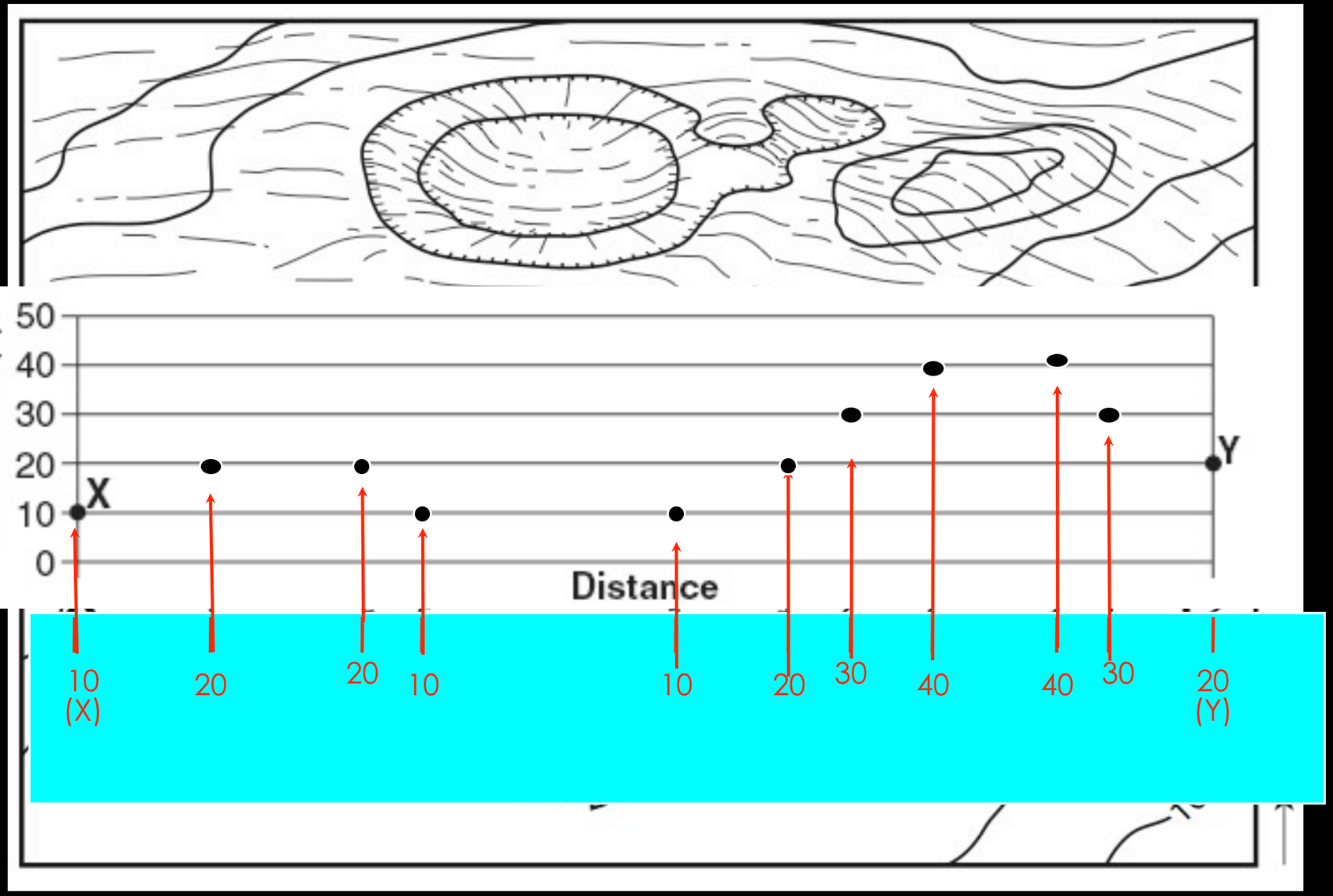
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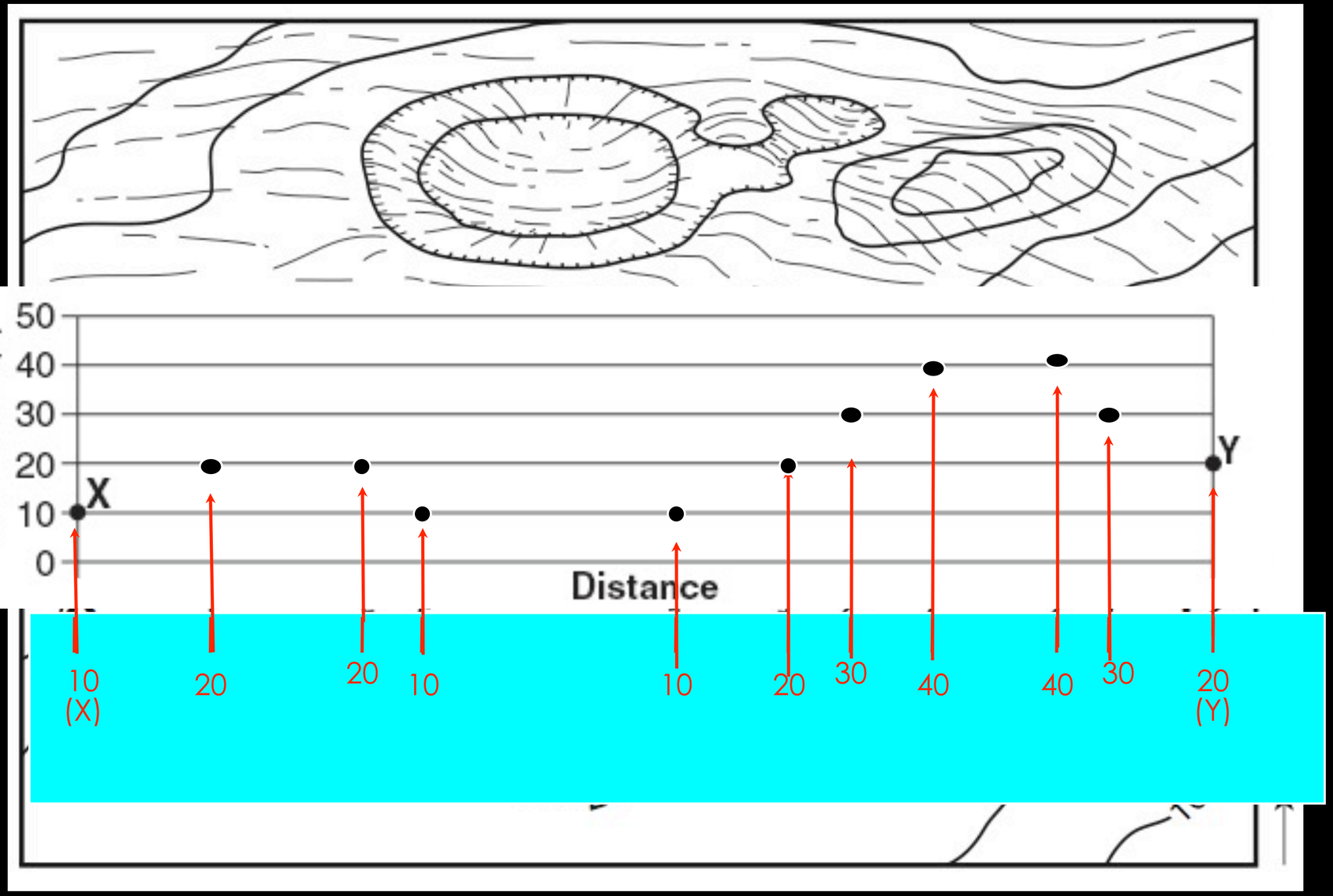
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