

V. Fields

1) A field is a region in space in which there is a measurable quantity at every point.

Examples:

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Examples:

2) Types of fields:

1) A field is a region in space in which there is a measurable quantity at every point.

Examples:

2) Types of fields:

Scalar =

1) A field is a region in space in which there is a measurable quantity at every point.

Examples:

2) Types of fields:

Scalar = needs only a number

1) A field is a region in space in which there is a measurable quantity at every point.

Examples:

2) Types of fields:

Scalar = needs only a number (temperature)

1) A field is a region in space in which there is a measurable quantity at every point.

Examples:

2) Types of fields:

Scalar = needs only a number (temperature)

Vector =

1) A field is a region in space in which there is a measurable quantity at every point.

Examples:

2) Types of fields:

Scalar = needs only a number (temperature)

Vector = needs number and direction

1) A field is a region in space in which there is a measurable quantity at every point.

Examples:

2) Types of fields:

Scalar = needs only a number (temperature)

Vector = needs number and direction (wind)

### 3) Field Maps

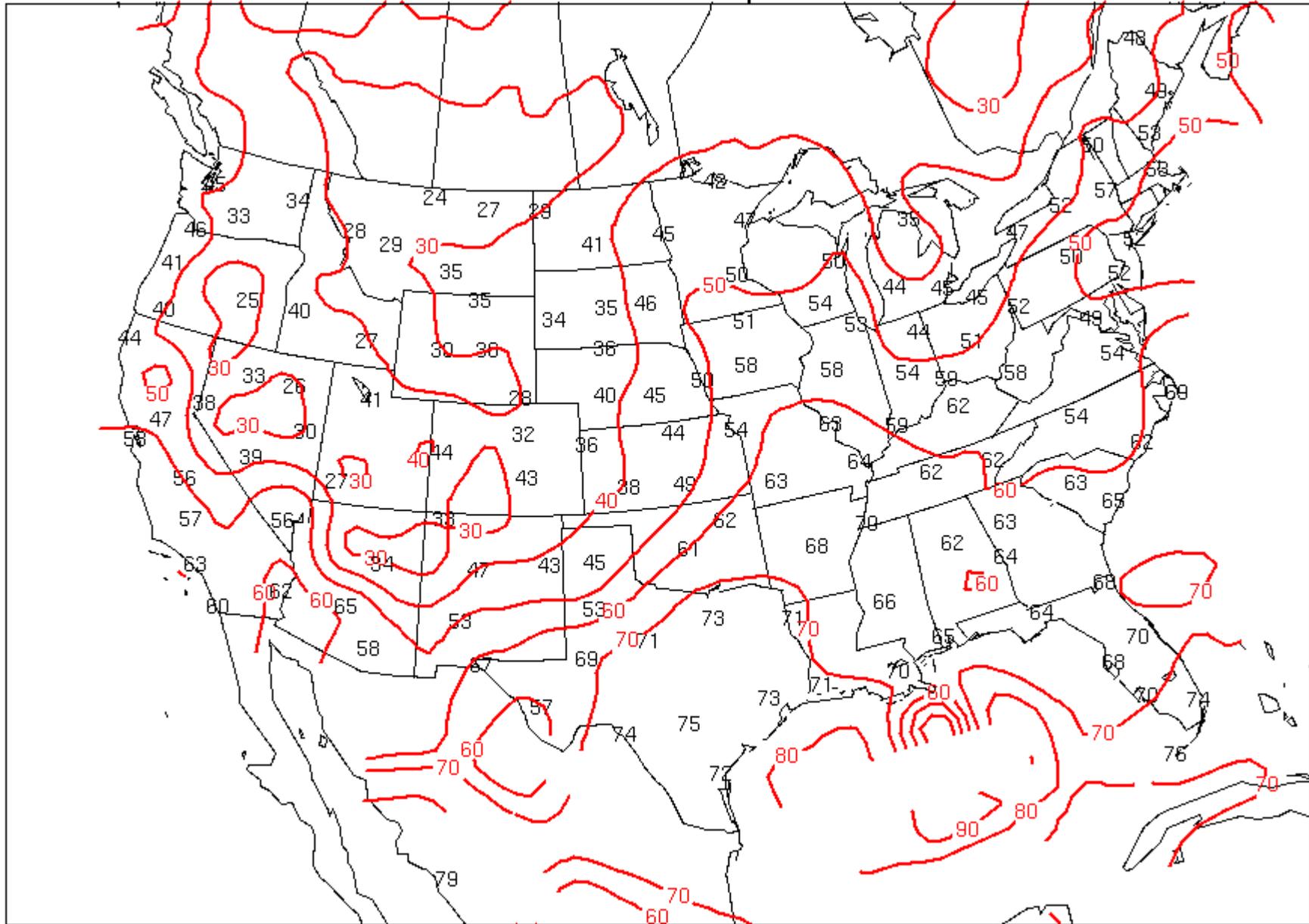
--maps with field values. All equal numbers are connected with lines, called isolines.

Types of isolines:

isotherms = lines of equal temperature

10Z 15 OCT 2013

### Isotherms & Temperatures



### 3) Field Maps

--maps with field values. All equal numbers are connected with lines, called isolines.

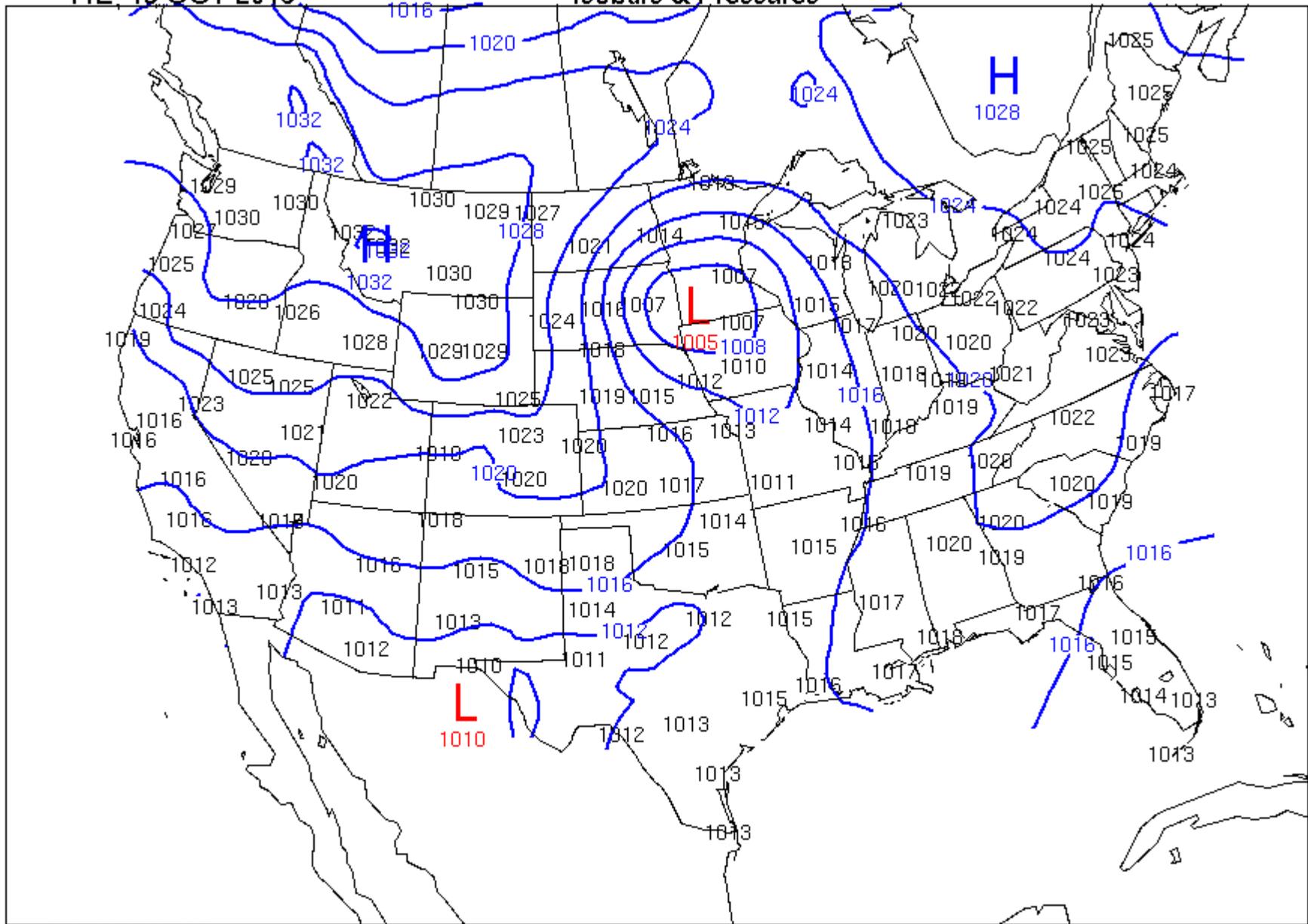
Types of isolines:

isotherms = lines of equal temperature

**isobar = lines of equal pressure**

11Z 15 OCT 2013

### Isobars & Pressures



NCEP/NWS/NOAA

Blue - Isobars (4mb)

### 3) Field Maps

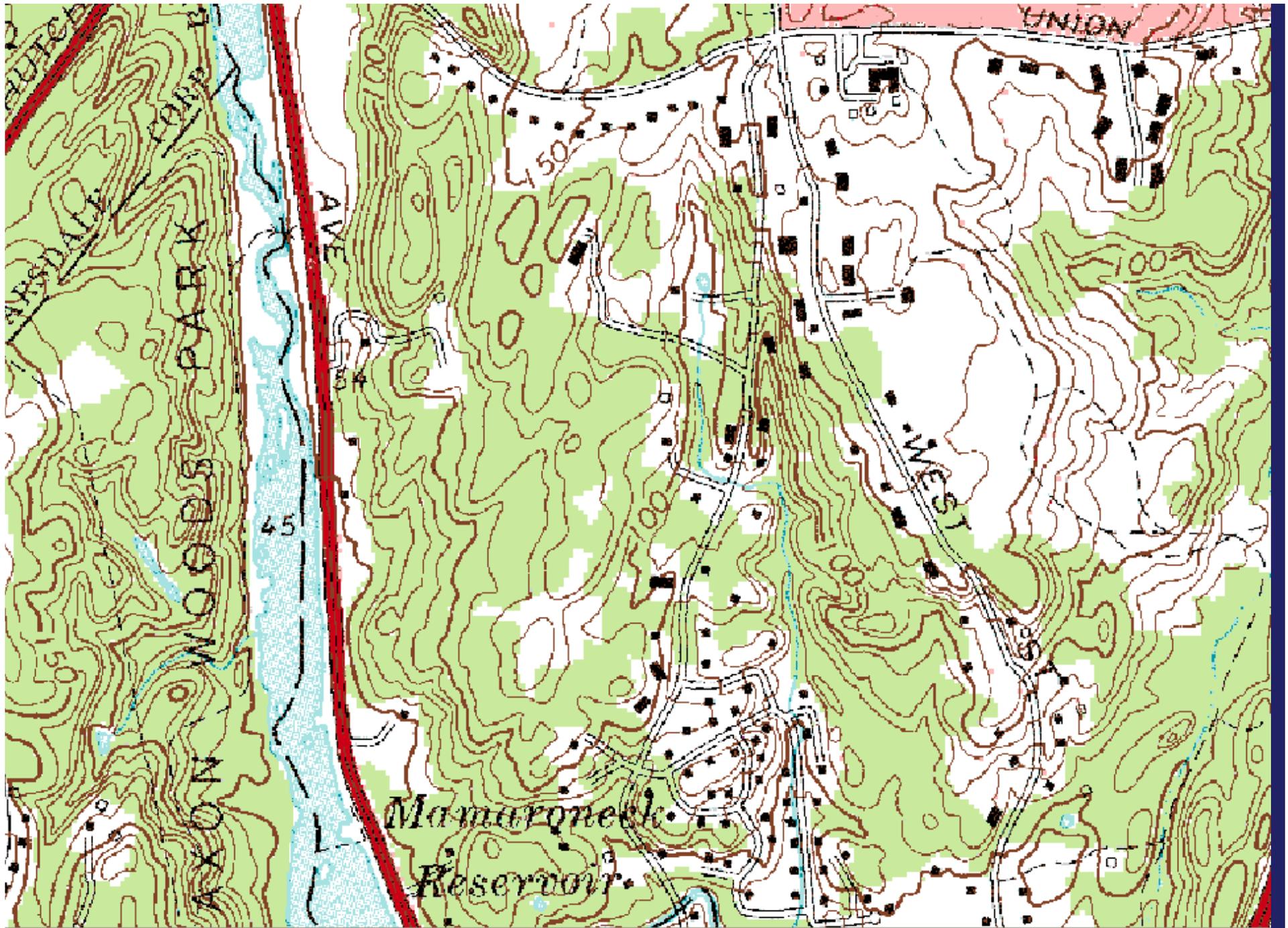
--maps with field values. All equal numbers are connected with lines, called isolines.

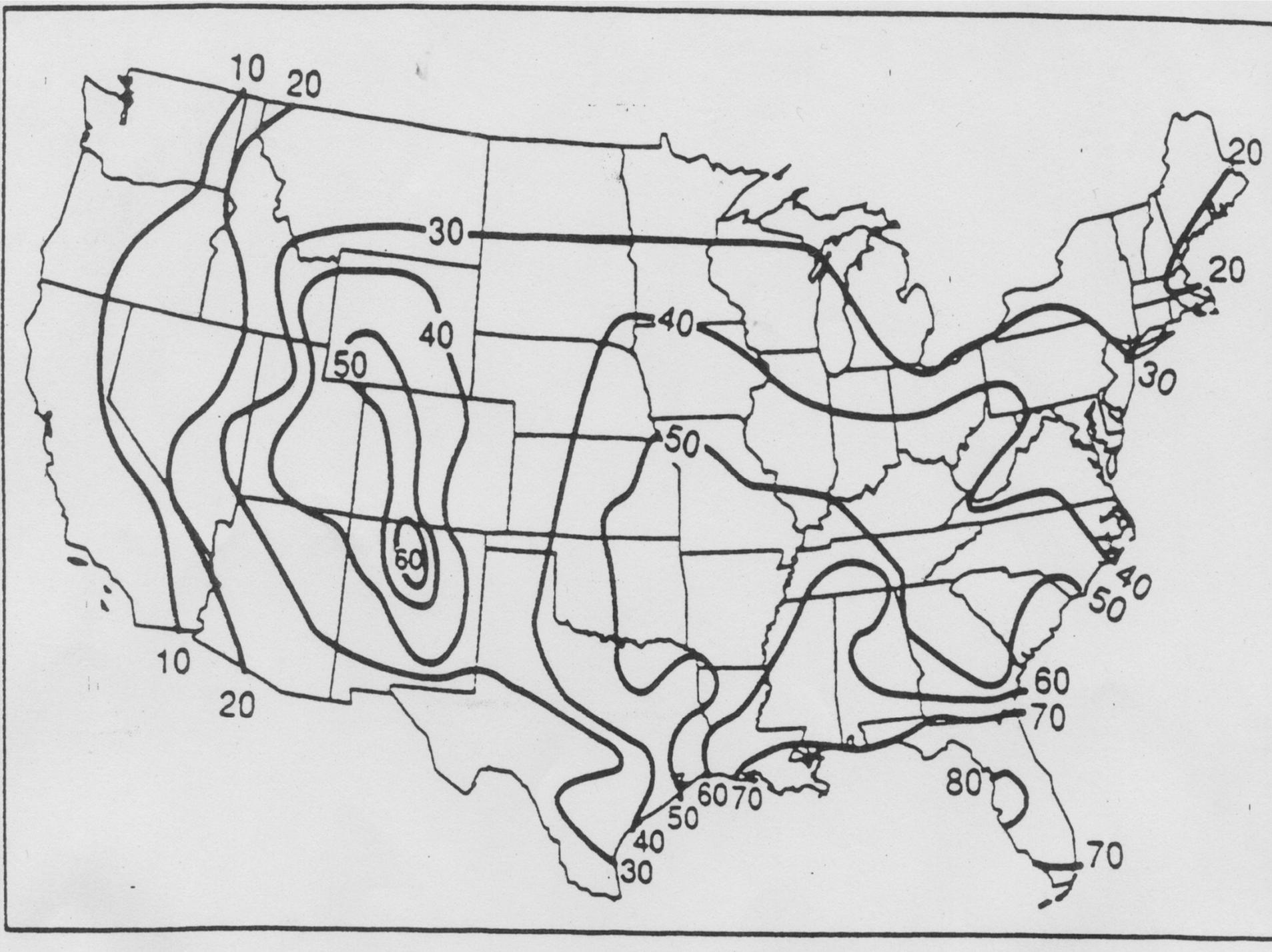
Types of isolines:

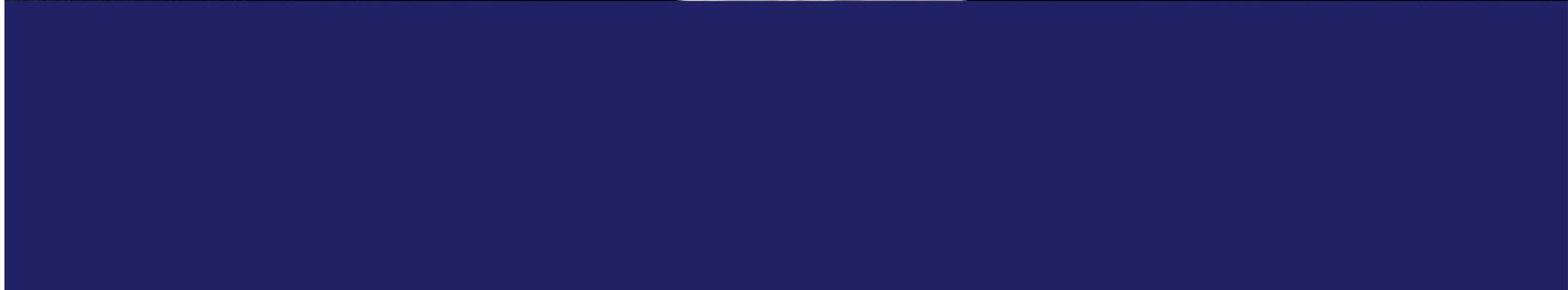
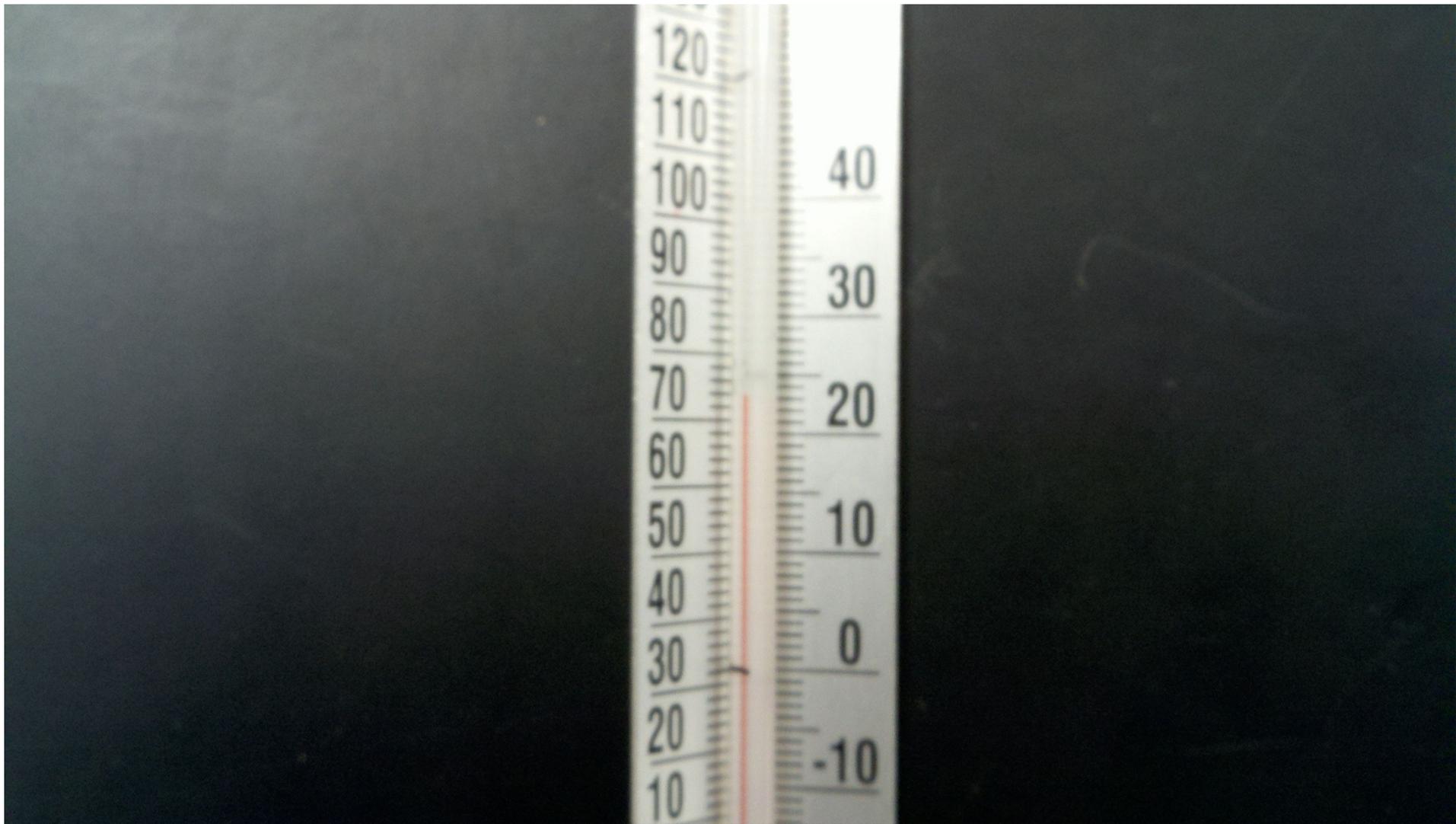
isotherms = lines of equal temperature

isobar = lines of equal pressure

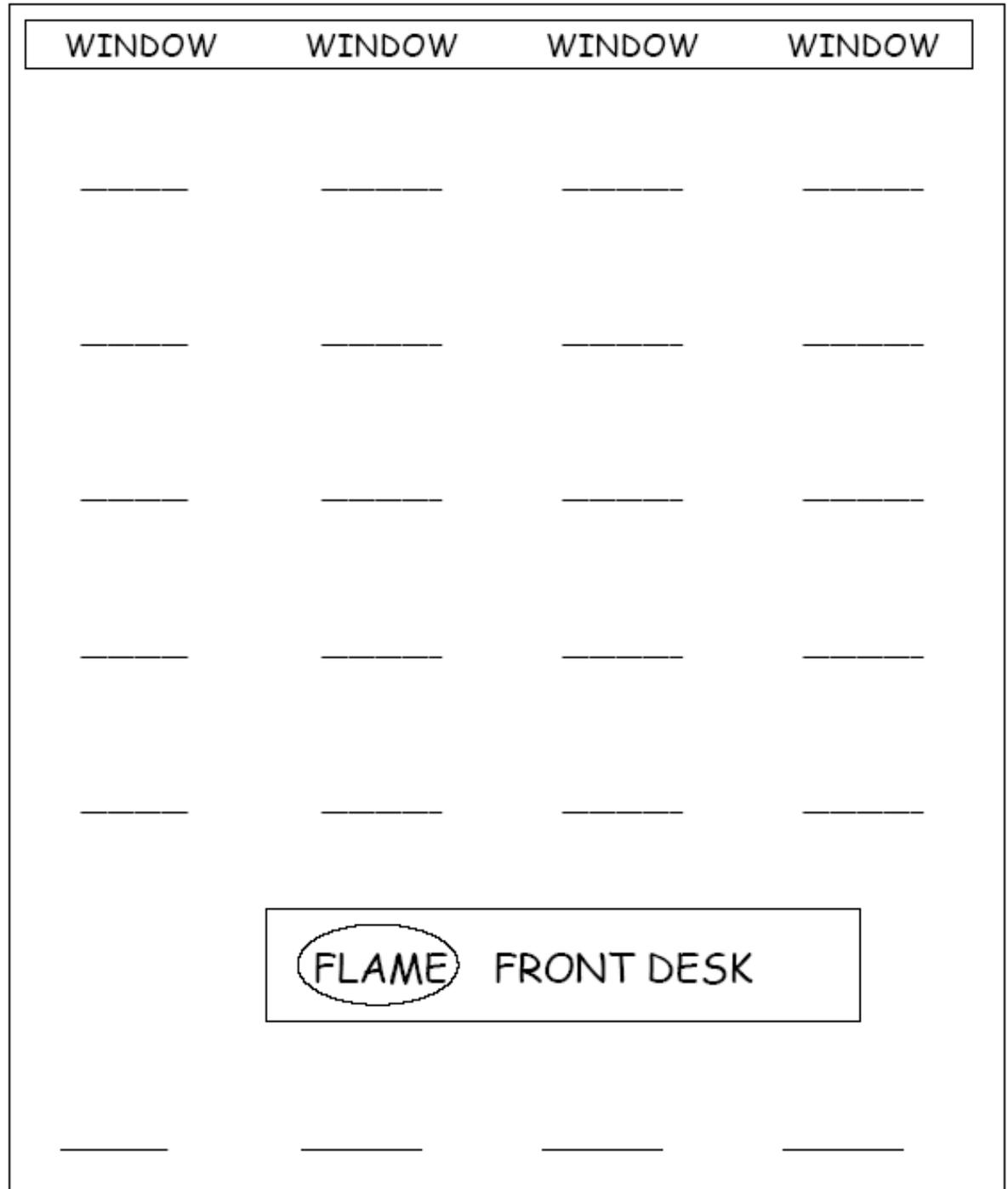
**contour lines = lines of equal elevation**



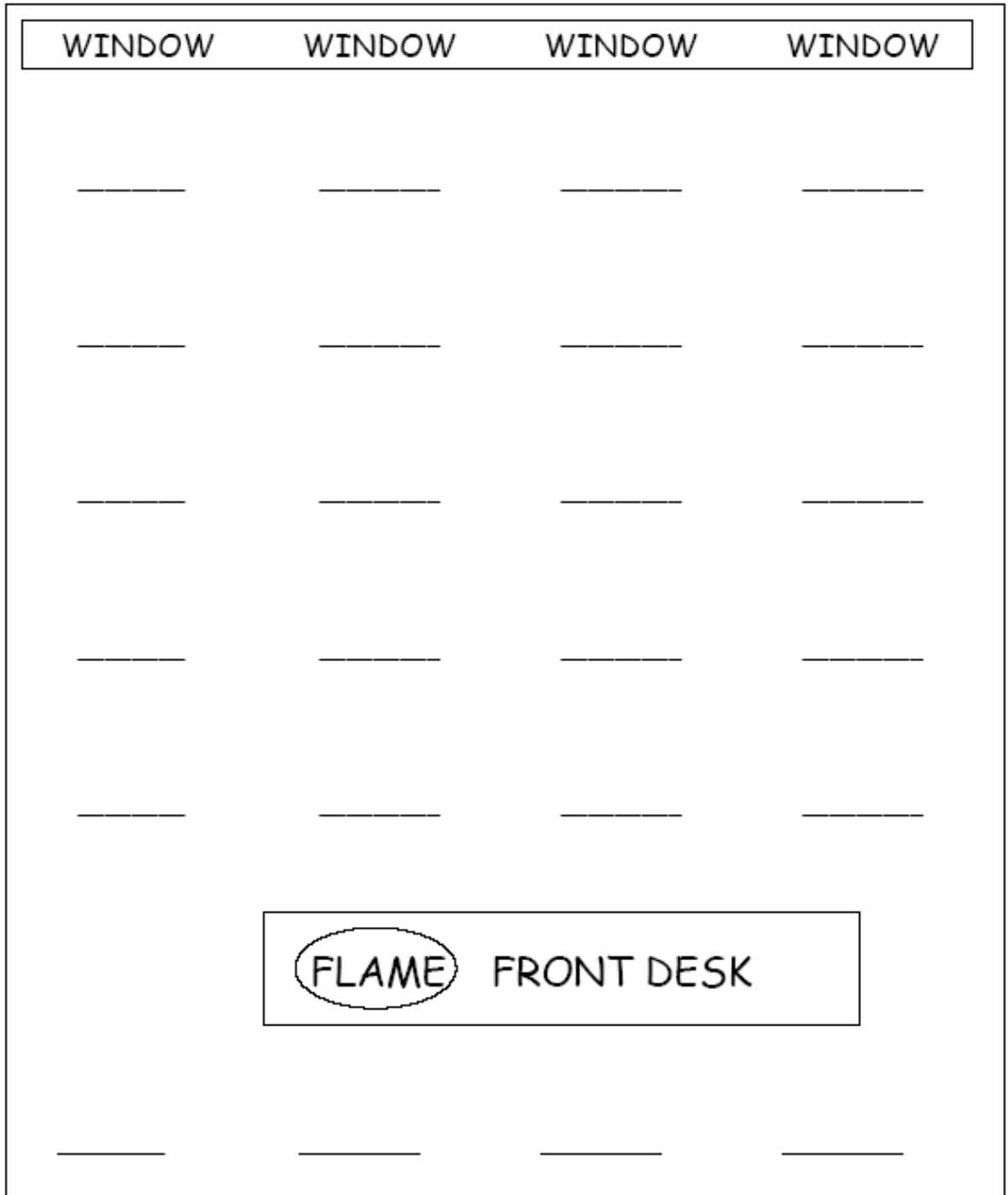




# Floor level



1 meter up



# Floor Level

*(copy to map in lab)*

WINDOW	WINDOW	WINDOW	WINDOW
<u>73.5</u>	<u>72.5</u>	<u>72</u>	<u>71</u>
<u>76.5</u>	<u>75</u>	<u>73.5</u>	<u>73</u>
<u>78.5</u>	<u>77</u>	<u>75.5</u>	<u>75</u>
<u>79.5</u>	<u>78</u>	<u>77</u>	<u>76.5</u>
<u>80</u>	<u>79</u>	<u>78</u>	<u>77</u>
<div style="border: 1px solid black; padding: 5px; display: inline-block;"><span style="border: 1px solid black; border-radius: 50%; padding: 2px;">FLAME</span> FRONT DESK</div>			
<u>80.5</u>	<u>80</u>	<u>79</u>	<u>78</u>

1 meter up

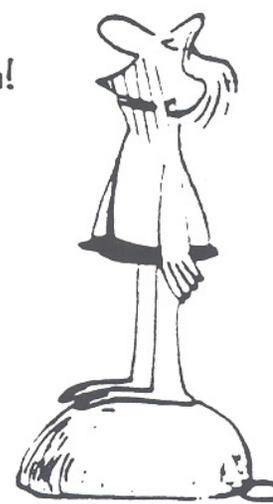
*(copy to  
map in lab)*

WINDOW	WINDOW	WINDOW	WINDOW
<u>75</u>	<u>74</u>	<u>73.5</u>	<u>72</u>
<u>78.5</u>	<u>77</u>	<u>76</u>	<u>74</u>
<u>79</u>	<u>78</u>	<u>77.5</u>	<u>76</u>
<u>81</u>	<u>79.5</u>	<u>78.5</u>	<u>77</u>
<u>82</u>	<u>80</u>	<u>79</u>	<u>78</u>
<div style="border: 1px solid black; padding: 5px; display: inline-block;"><span style="border: 1px solid black; border-radius: 50%; padding: 2px;">FLAME</span> FRONT DESK</div>			
<u>82.5</u>	<u>82</u>	<u>80</u>	<u>78.5</u>

13	15	16	16	18
12	13	14	15	17
11	12	13	14	15
10	12	13	15	16

What  
a  
Cinch!

Isoline  
Map A



Define Isoline:

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30	31	32	30	29
31	32	33	31	30
31	34	35	32	30
30	32	33	31	29
29	30	31	30	28

Isoline Map B

Map 1

Isoline Interval: 10

(Hint: Do 70 first, then 80, 90, etc.)

75	82	90	100	103	94	81
84	92	110	126	122	114	87
89	99	117	135	111	97	89
99	108	130	124	101	84	74
98	102	115	100	94	75	67

Map 2

isoline interval: 5

(Hint: Start with -10, then -5, 0, etc)

-7	-2	0	2	8	12	16	9
-9	-4	3	5	9	15	15	10
-11	-5	5	8	14	20	18	11
-10	-4	5	11	15	22	18	10
-5	0	6	10	14	15	13	8
-3	0	7	9	10	8	4	2
-5	-1	5	5	5	2	-1	-6

19°

22°

23°

24°

20°

21°

22°

24°

20°

21°

22°

24°

22°

22°

23°

25°

23°

24°

25°

27°

**A****B**

20°      21°      22°      24°      26°

19°      20°      22°      25°      28°

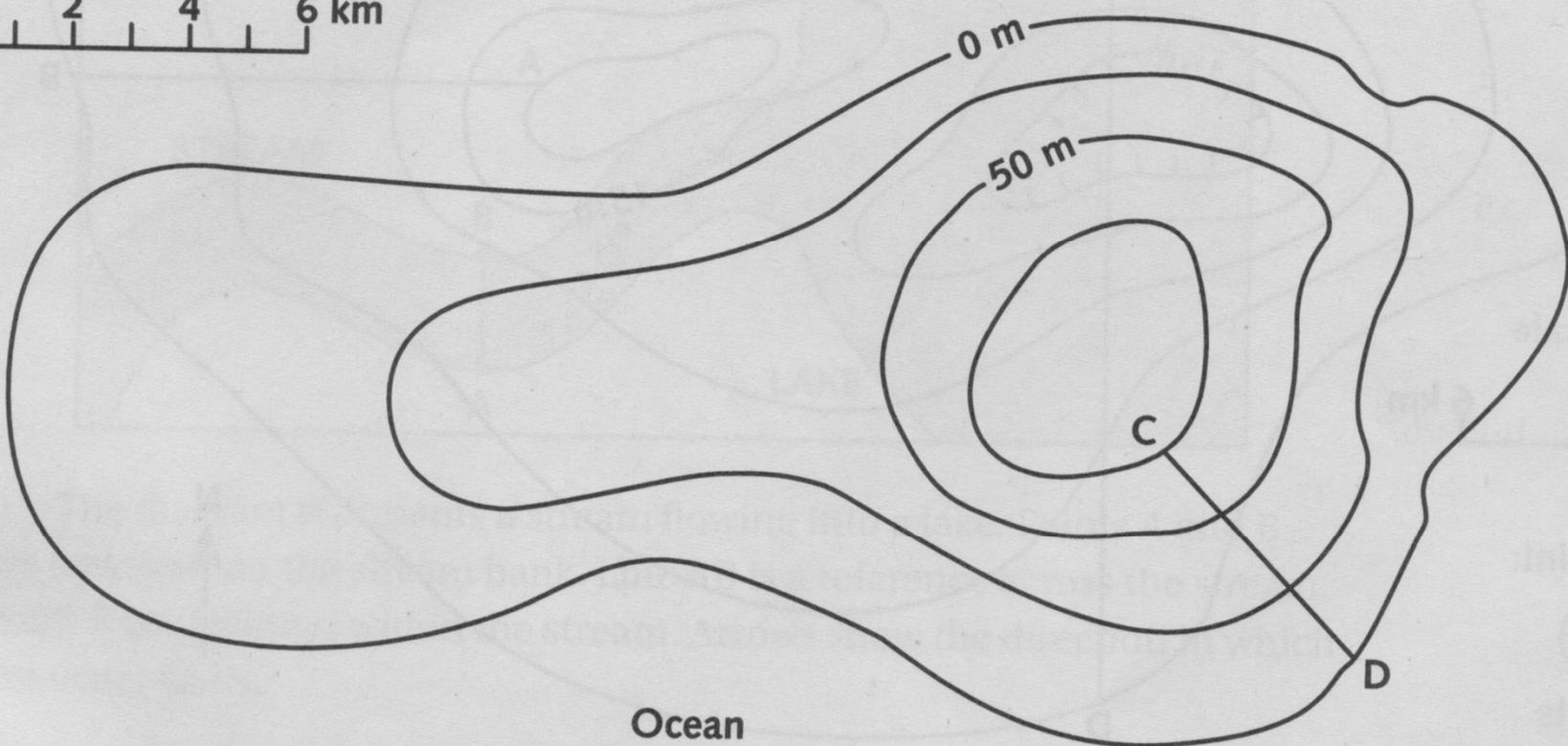
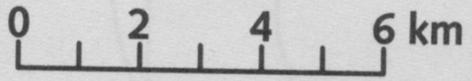
18°      19°      24°      27°      27°

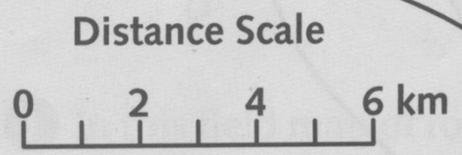
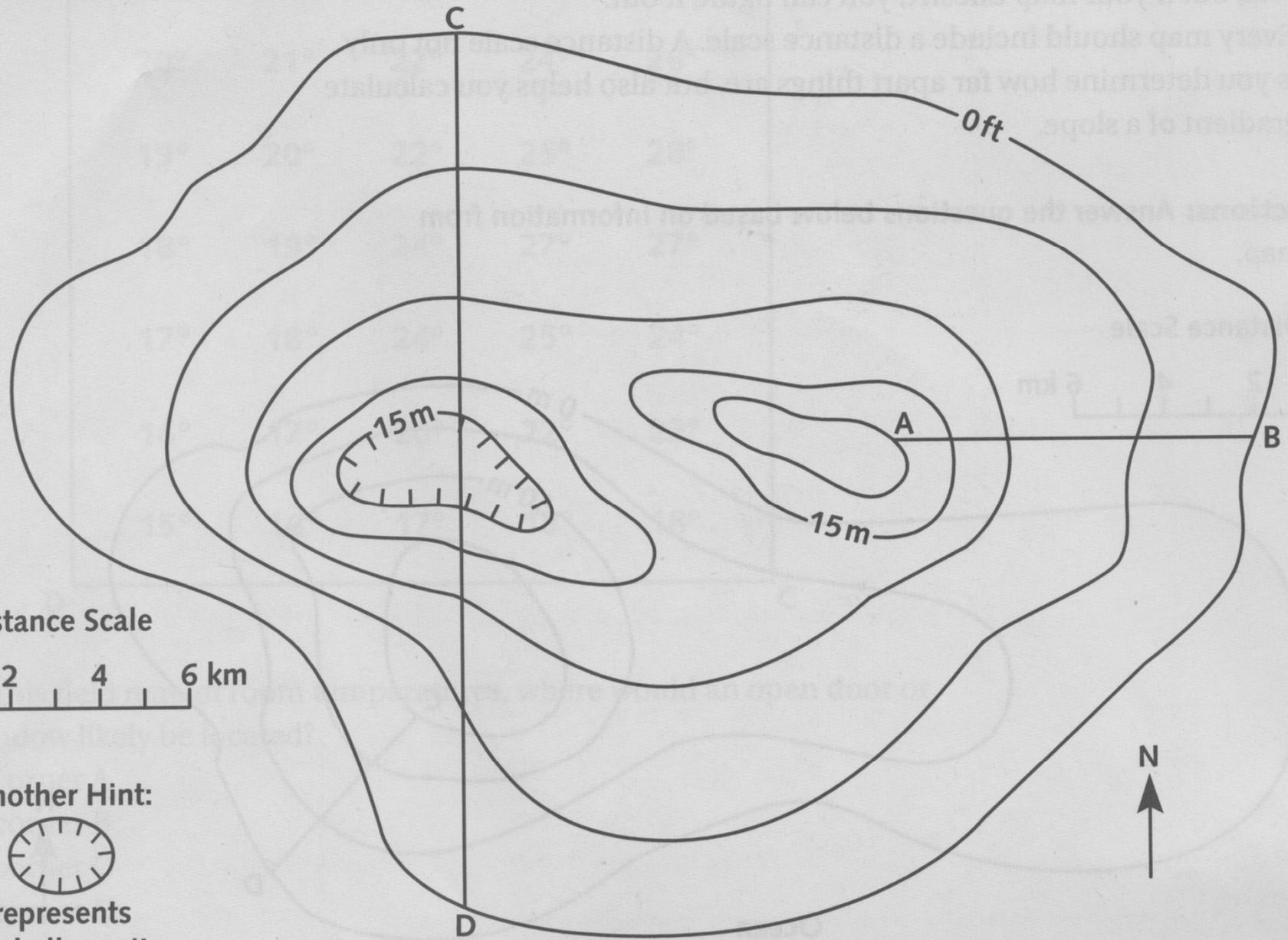
17°      18°      24°      25°      24°

16°      17°      20°      22°      22°

15°      16°      17°      18°      18°

**D****C**





Another Hint:



represents  
a shallow pit



USE INTERVAL OF ONE DEGREE C

8	7.8	7.5	7.3	6	6	5.3	4
8.1	8	7	6.3	6.1	5.4	5	4
8.2	8	7	7	6.7	6	5	4.1
8.2	7.7	7.1	7.1	6	6	5.3	4.9
8.4	7.3	7.3	7	6.9	6.6	6	5
7.5	7.2	7	6.8	6.7	6.6	6	5
7	7	6.9	6.4	6.3	6.1	6	6

USE INTERVAL OF 2 START WITH

56	56	57	58	59	59	58	58
56	57	57	58	59	59	58	58
56	57	57	58	59	60	59	59
57	58	59	60	61	60	59	59
58	59	60	61	62	61	60	59
60	61	62	63	62	61	60	59
58	59	60	61	62	61	60	59
57	58	59	60	61	60	59	59

86	89	95	100	108	112	120	129
89	99	108	115	119	124	127	132
88	88	92	105	111	117	118	120
96	95	101	107	112	114	118	119
72	80	90	99	104	107	114	118
62	73	84	99	104	107	113	115
45	51	76	88	90	100	105	111
29	30	50	70	85	90	96	101

US

Sept

mas)

A

C

22	22	23	23	22	21	20
21	20	20	19	19	18	18
19	19	20	19	18	18	17
18	17	16	17	17	16	15

B

D

A

C

45	46	50	55	57	55	50
44	45	40	40	45	44	45
40	40	38	40	40	39	41
35	33	37	38	34	35	34

B

D

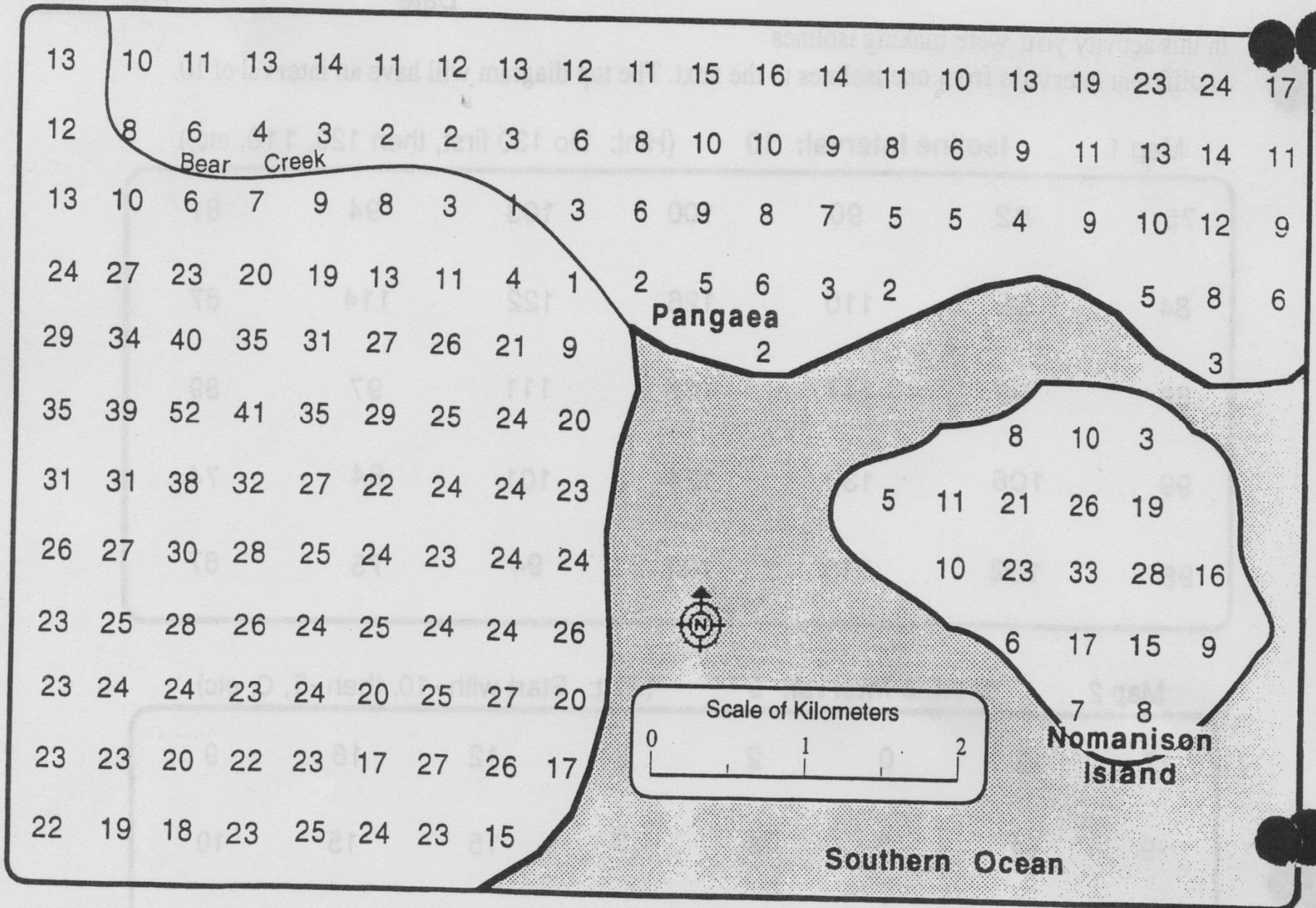
A

C

77	74	66	70	68	70	70
72	72	70	66	66	66	65
60	60	64	65	62	60	59
54	53	54	63	58	57	55

B

D





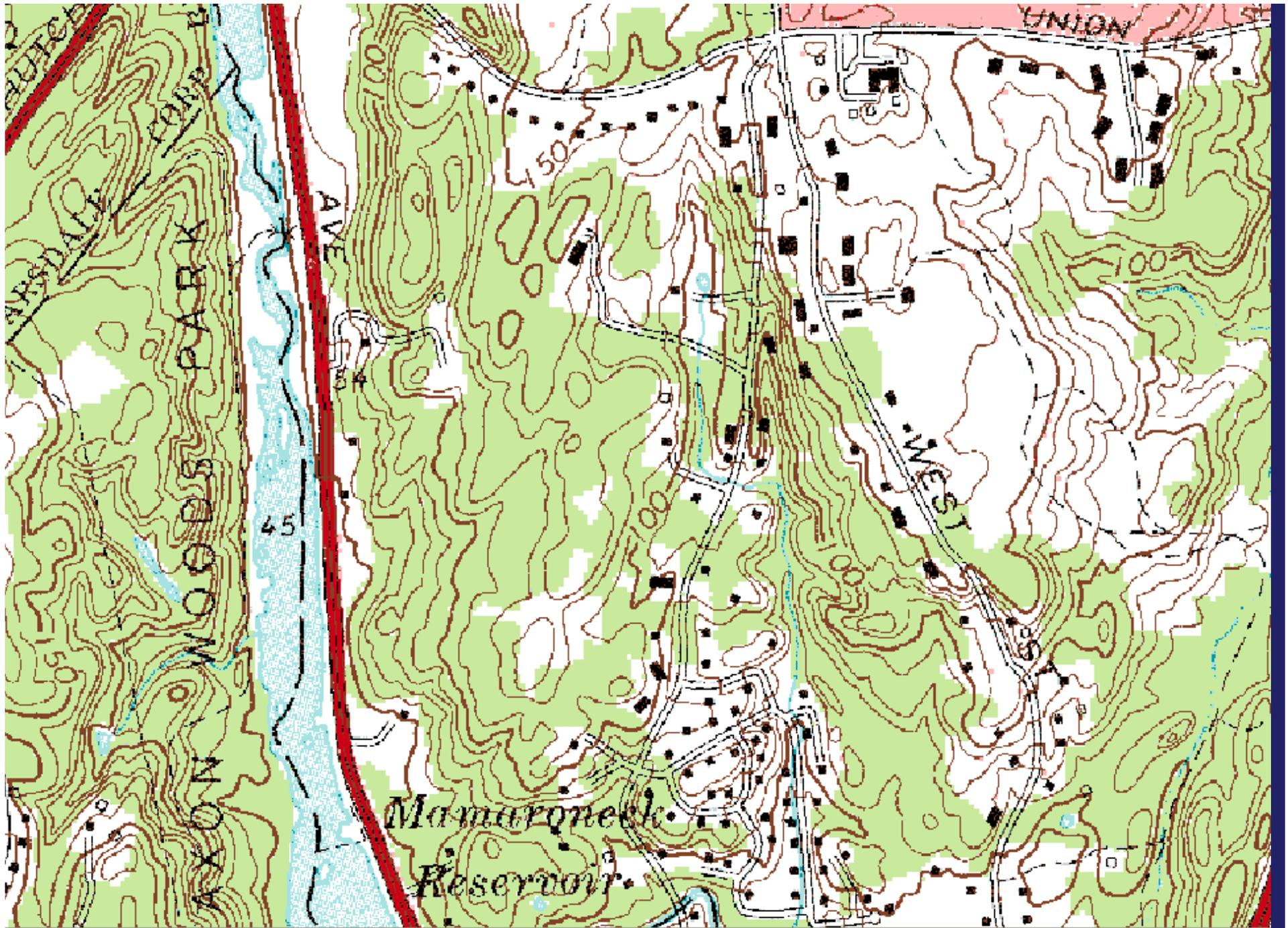
Harrison Ariel

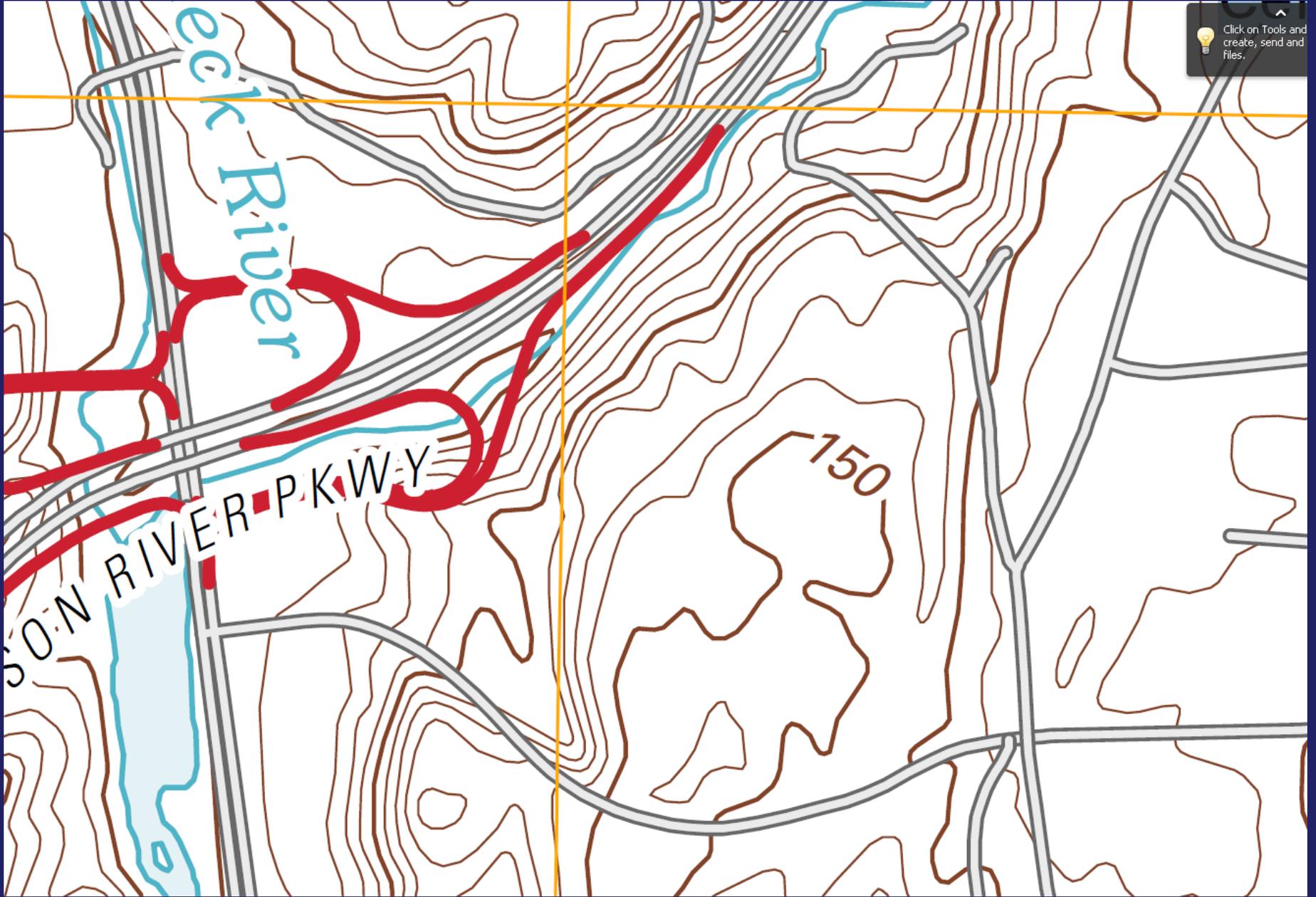
Harrison Topo

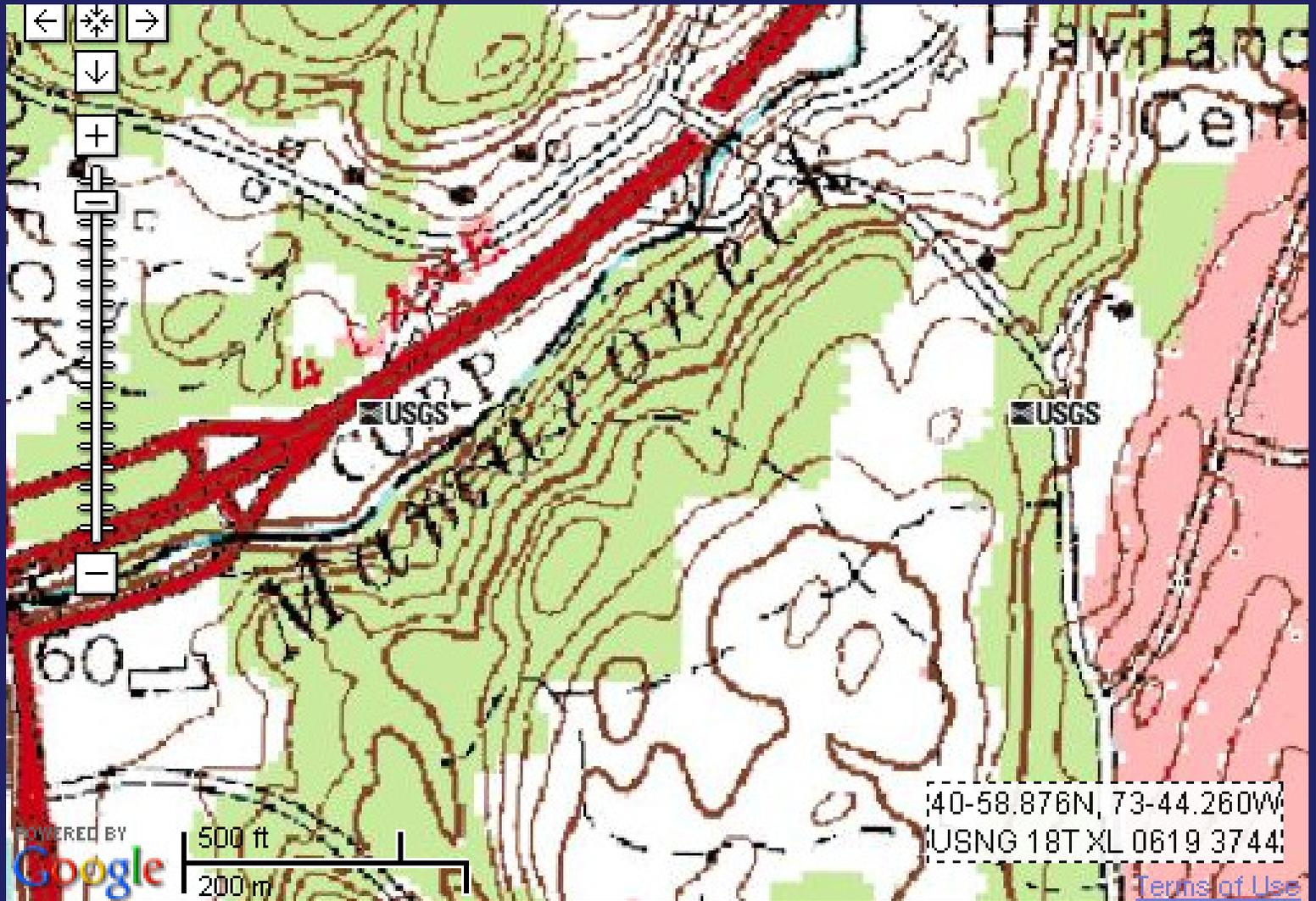
- Google earth

# Terra Server

- <http://terraserver.microsoft.com/default.aspx>

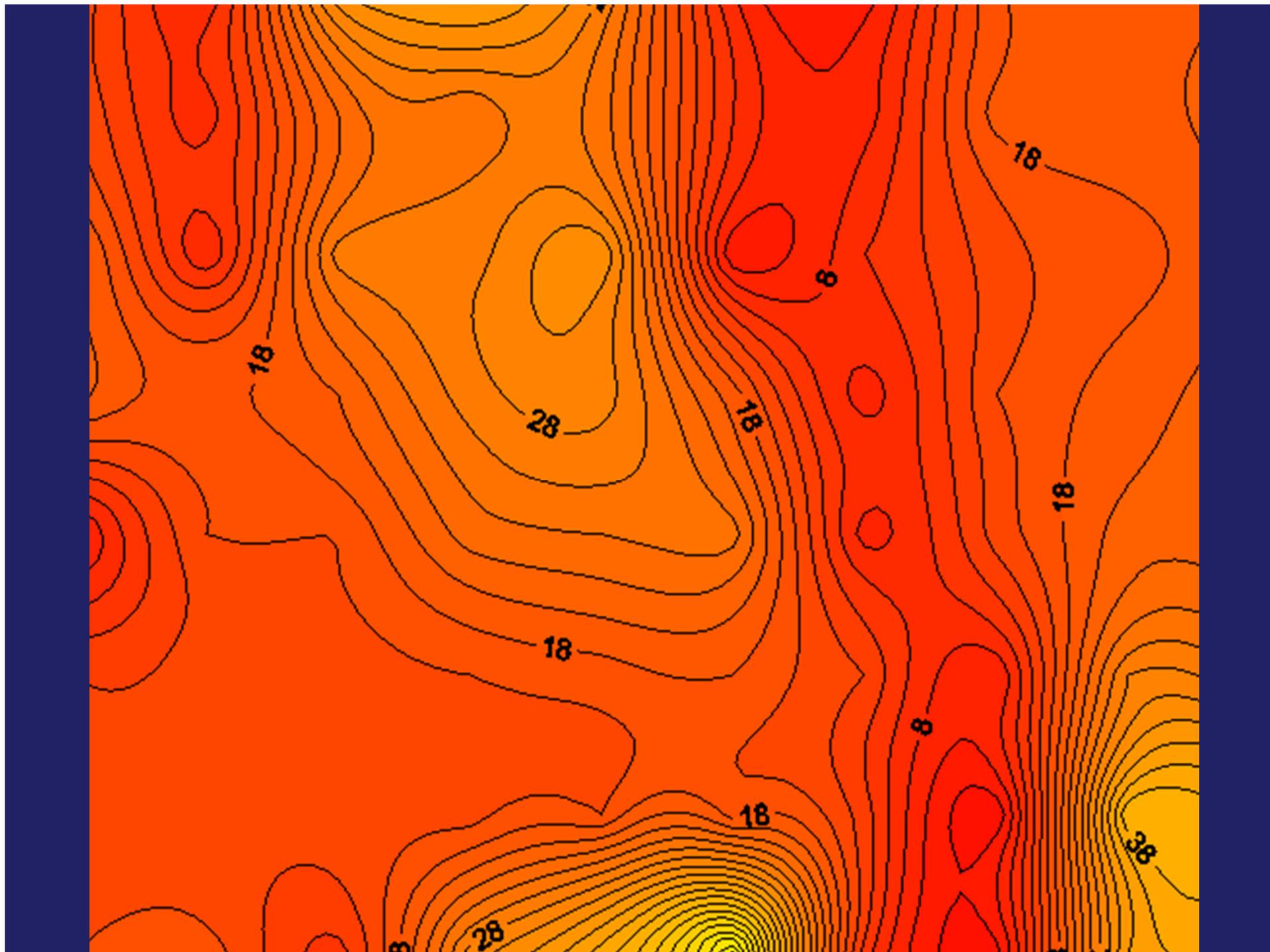






## Topo map rules:

- 1) There is a contour interval (difference in elevation between contour lines)



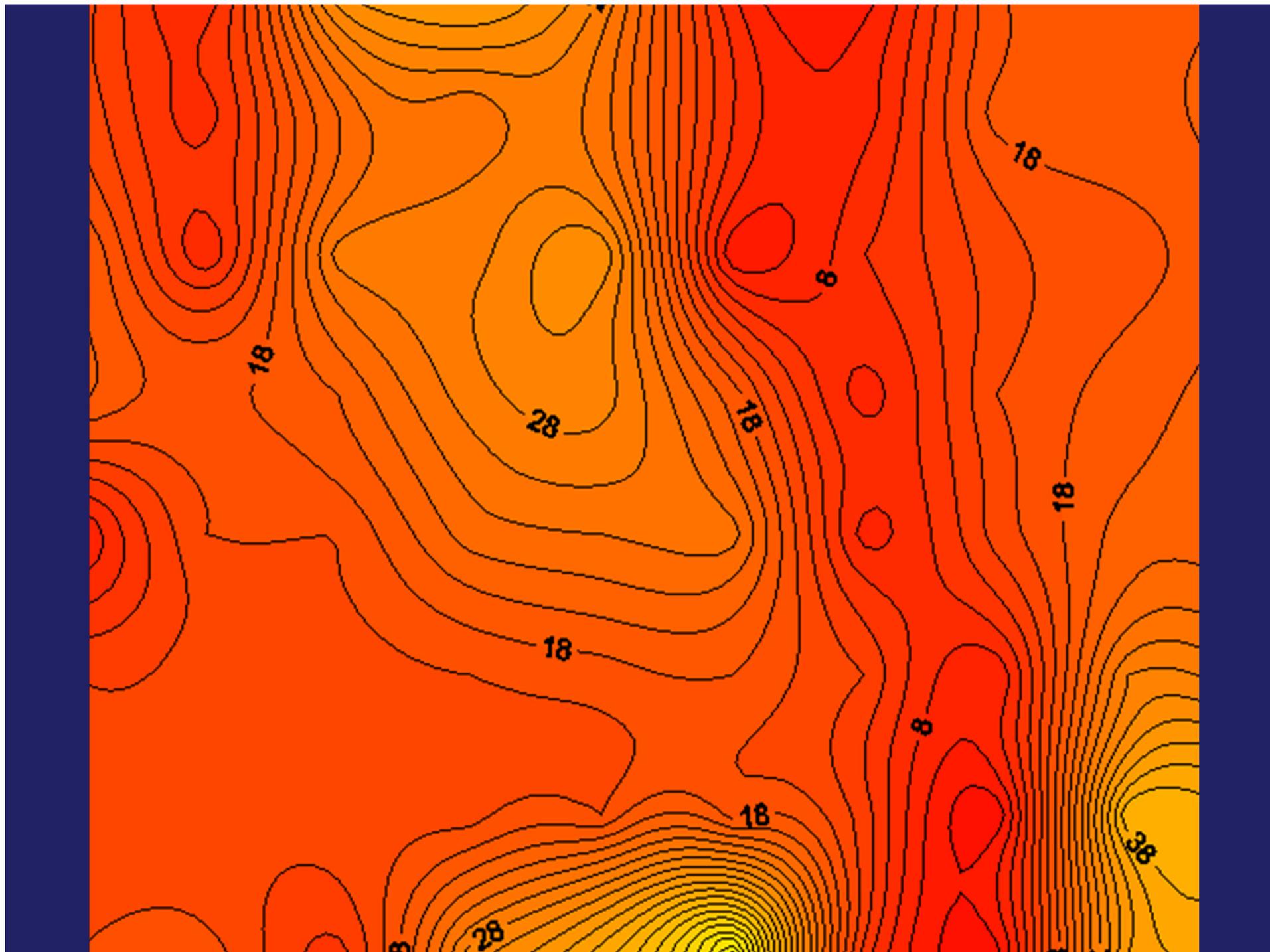
## Topo map rules:

- 1) There is a contour interval –  
(difference in elevation between contour lines)
- 2) Contour lines make a “V” shape where a river crosses them. The “V” always points upstream (opposite the way the river is flowing).

<http://teraserver.microsoft.com/image.aspx?t=2&s=12&x=720&y=6103&z=18&w=2>

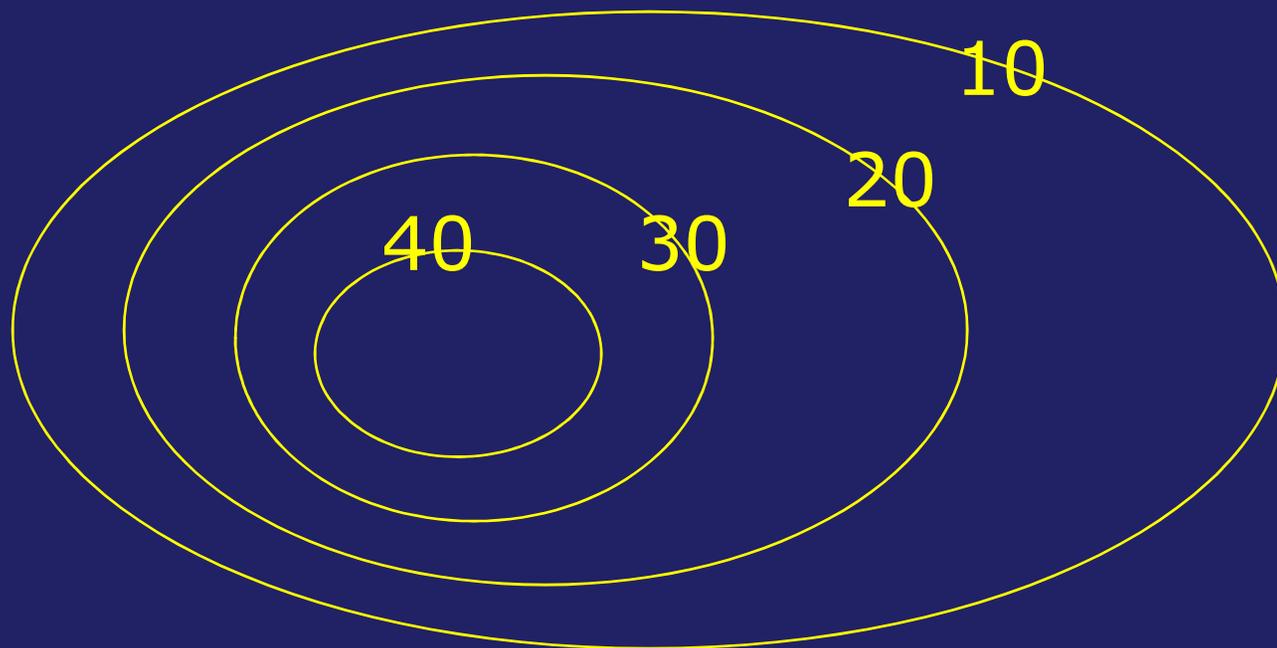
## Topo map rules:

- 1) There is a contour interval – (difference in elevation between contour lines)
- 2) rivers make a “V” shape. The “V” always points upstream (opposite the way the river is flowing).
- 3) contour lines NEVER touch!

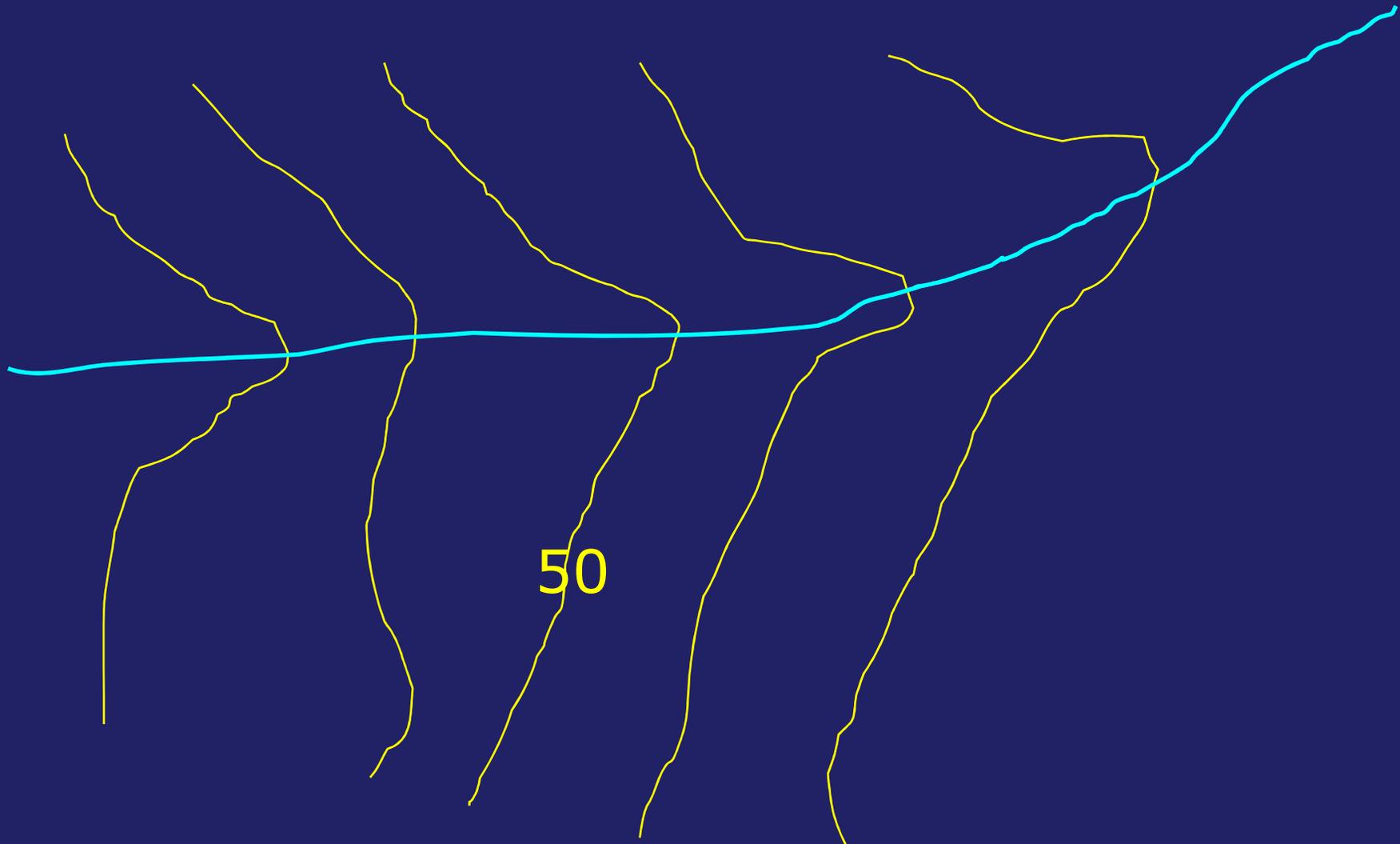


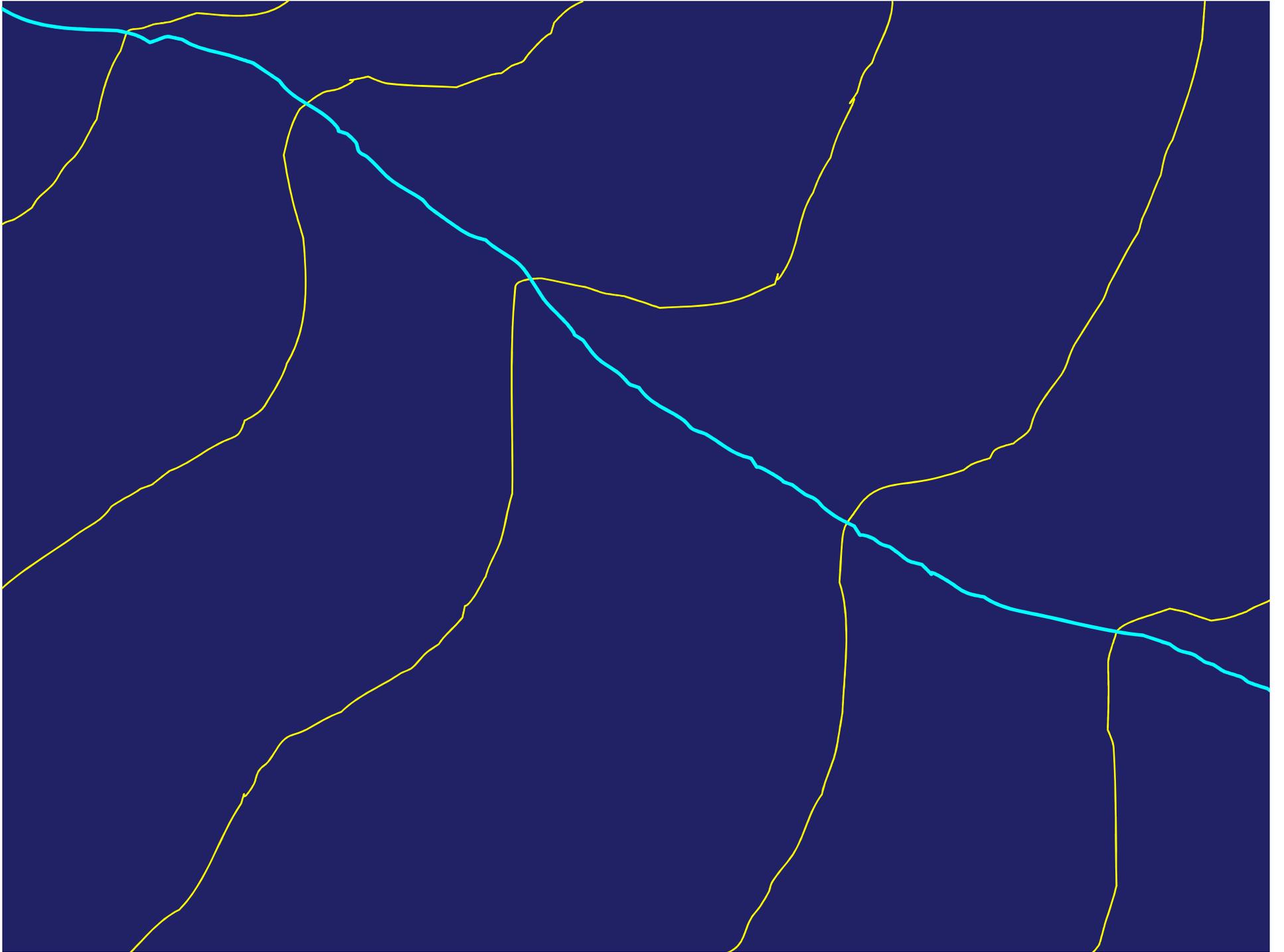
## Some common topo map features:

1) Hill = enclosed circles

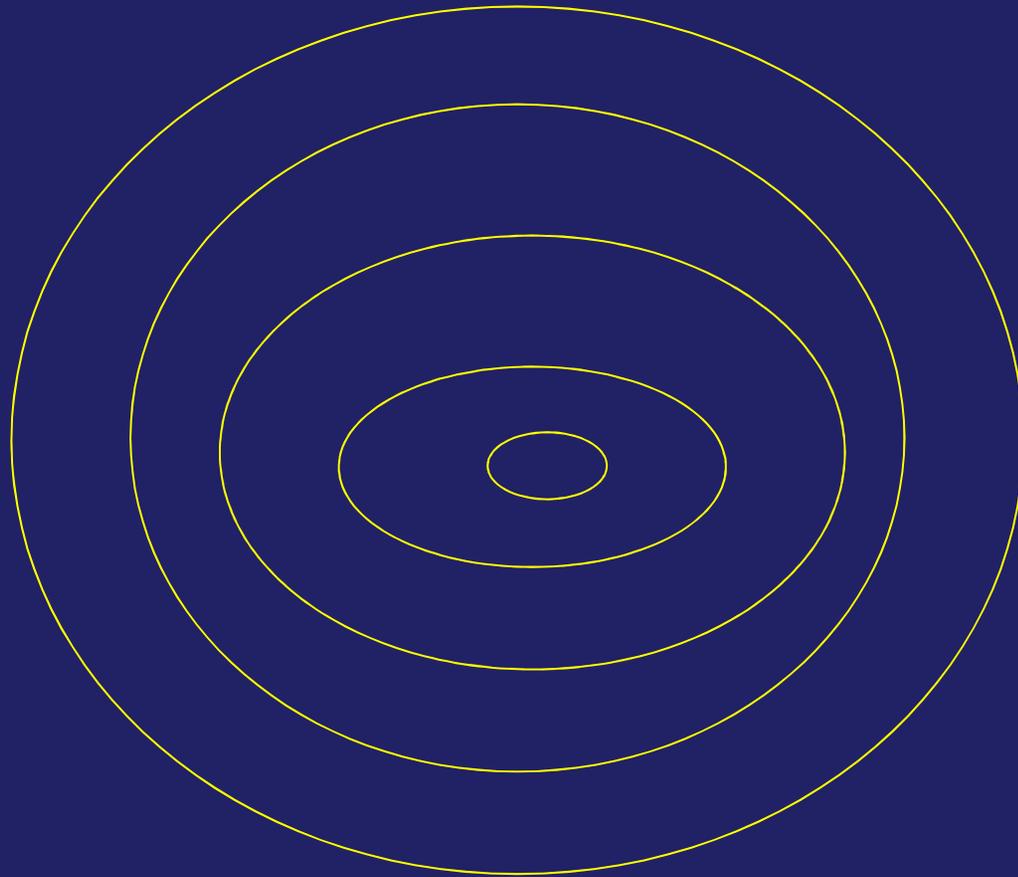


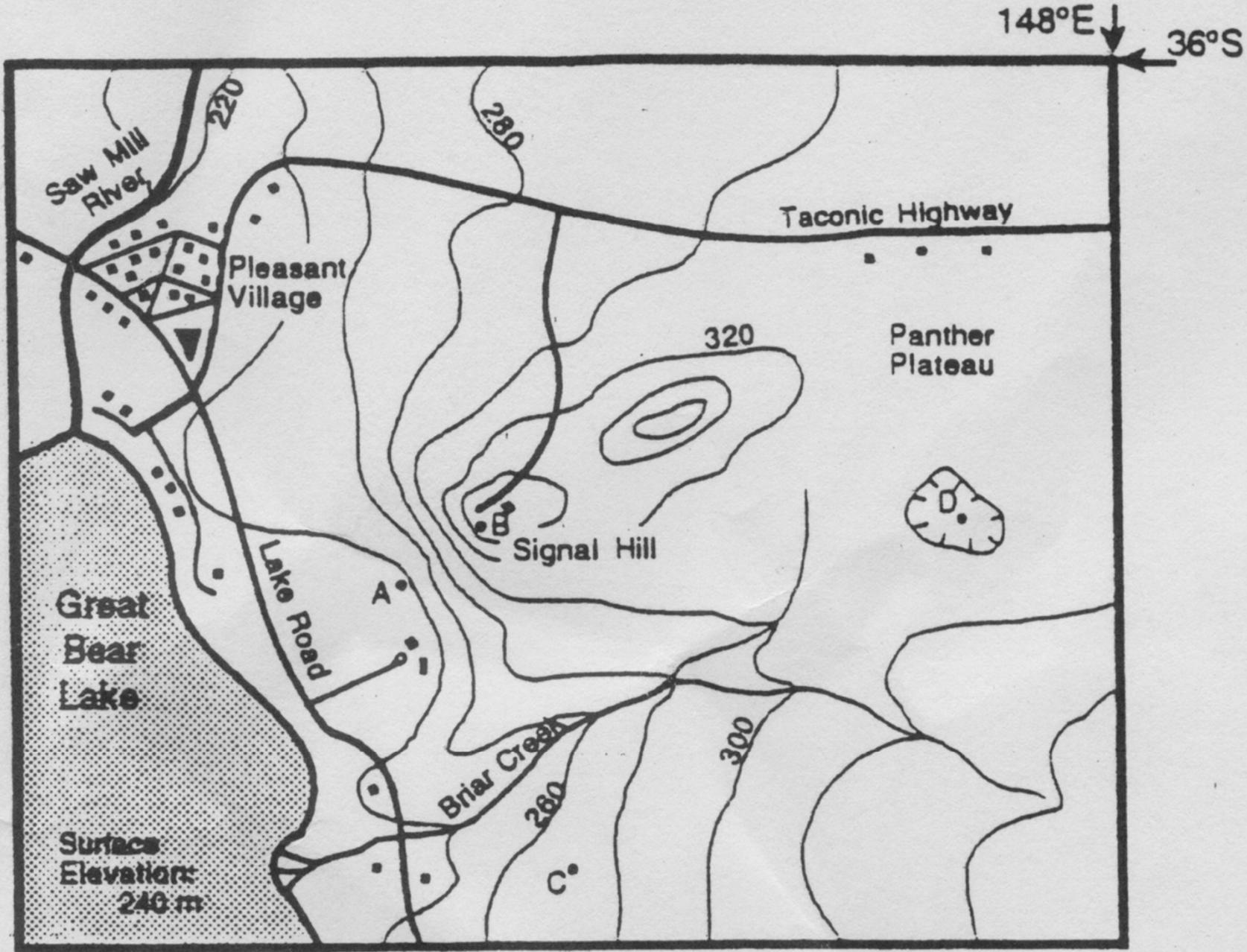
River: "V" points upstream

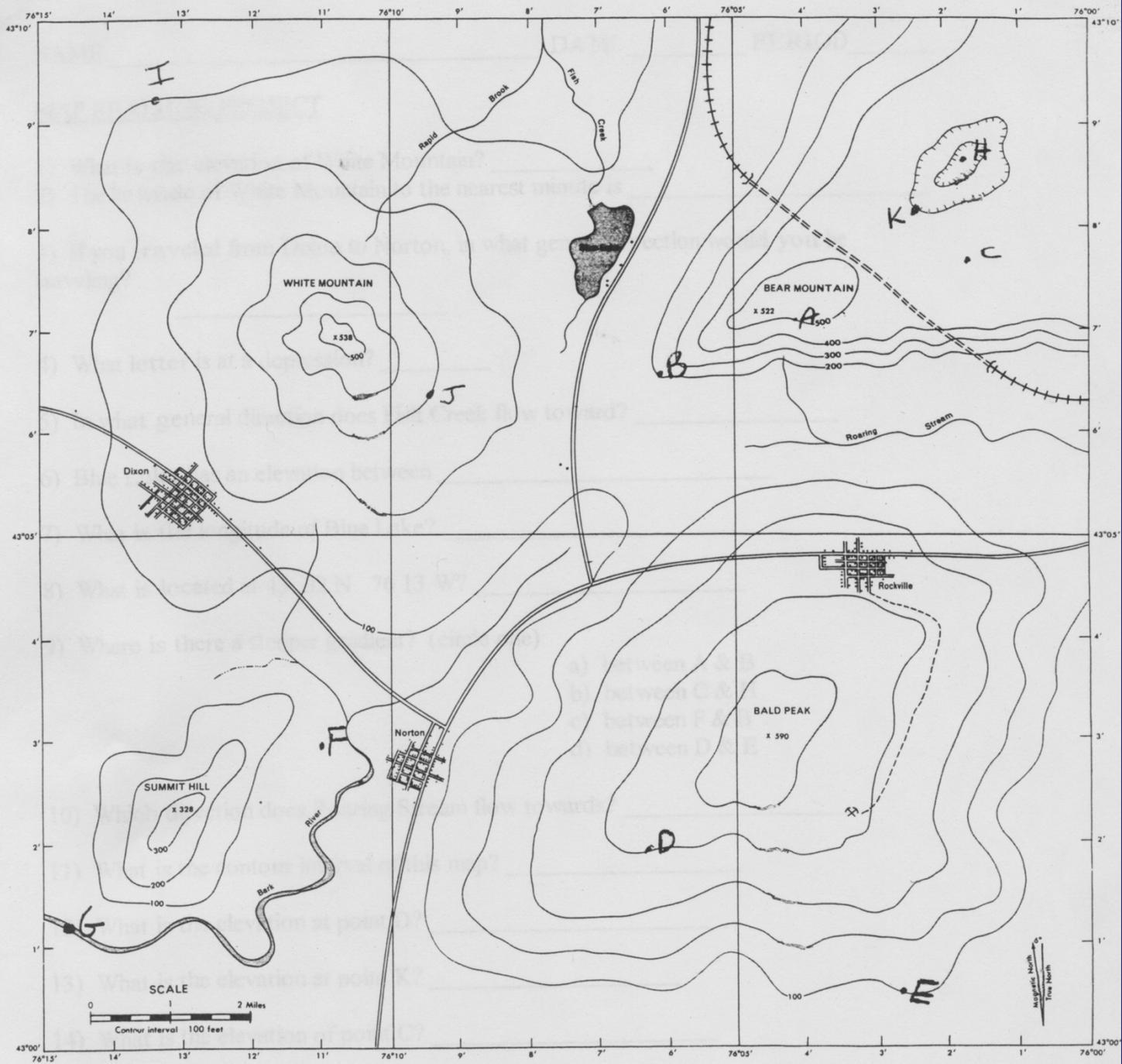


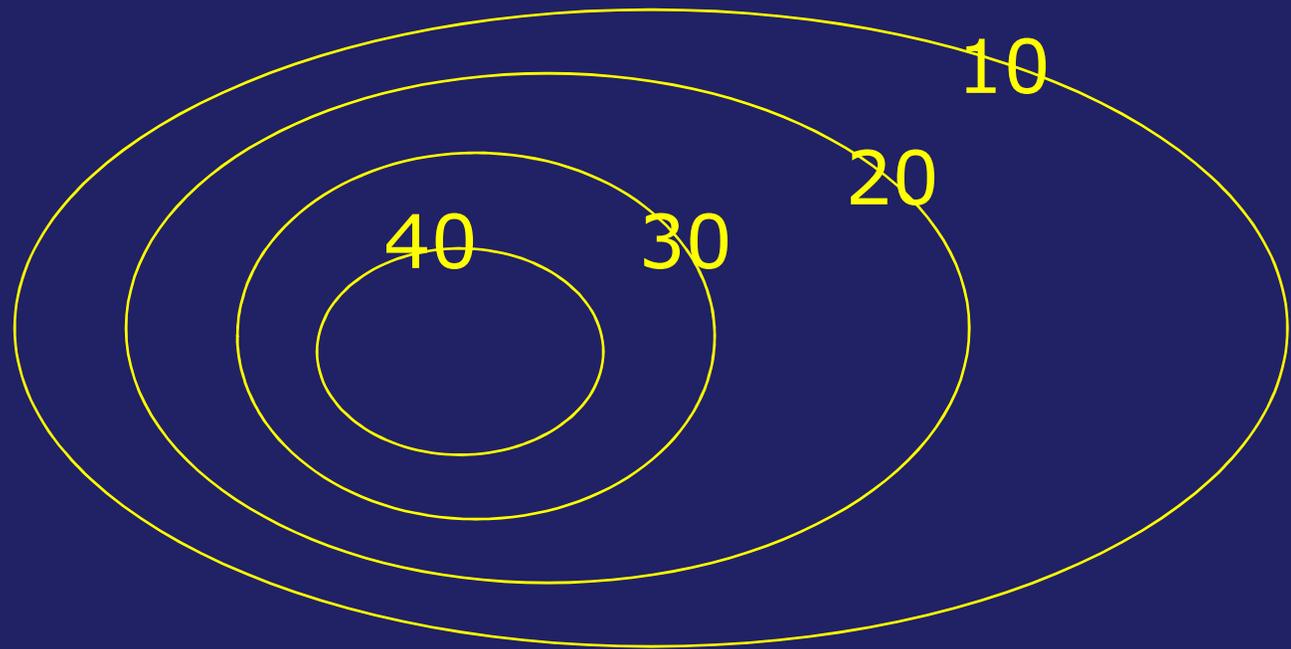


# Depression (hole in ground)









# 3D Topo Models

Hill

Valley

Mountain

Depression

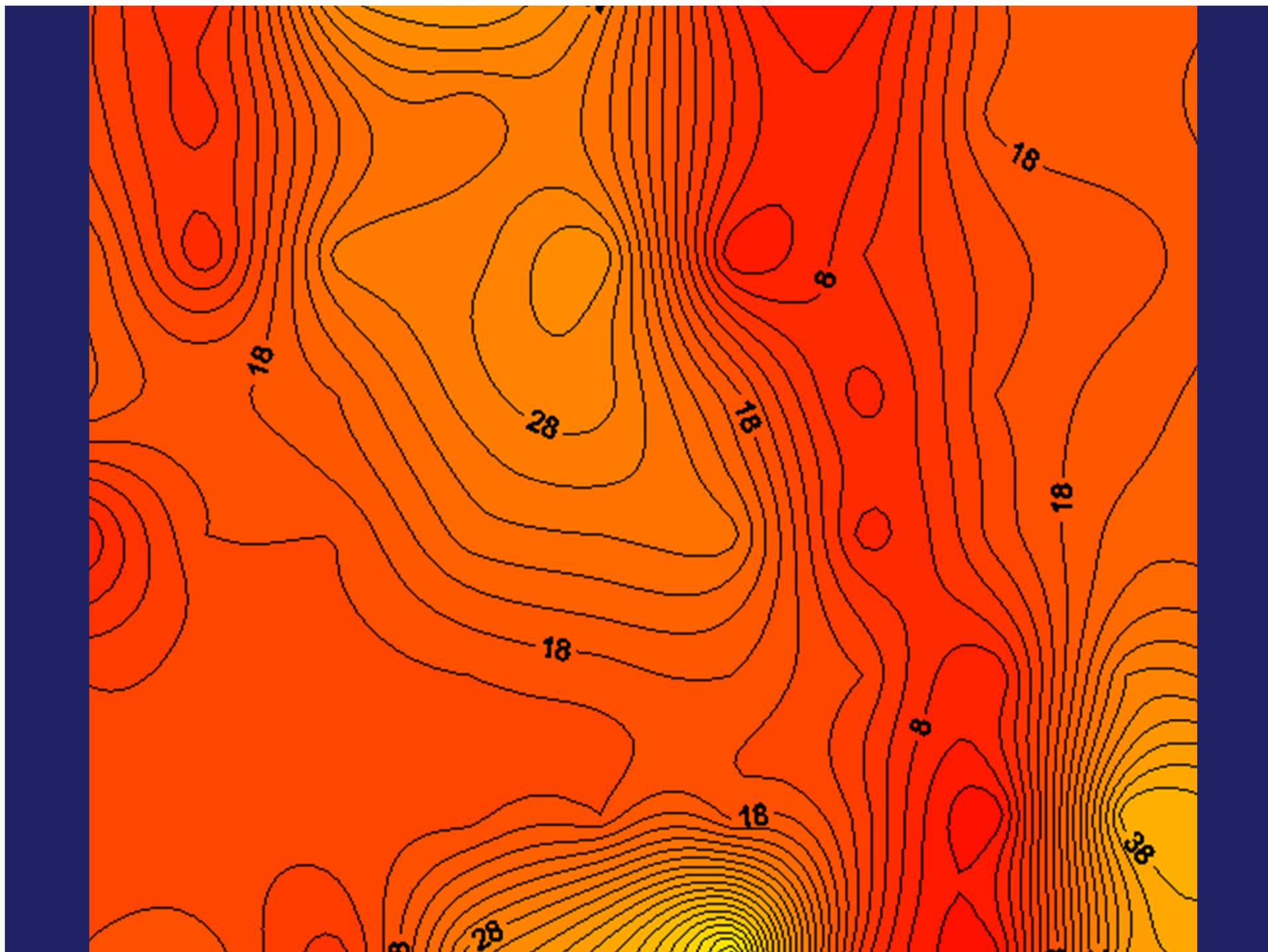


gradient-

-how steep a slope is:

if contour lines are close together = steep  
gradient

if contour lines are far apart = gentle  
gradient



## Calculating a gradient:

$$\text{gradient} = \frac{\text{difference in elevation}}{\text{change in distance}}$$

# Kingda Ka







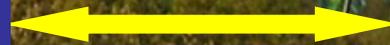
altitude=  
456 feet

What is the gradient of the first drop of Kingda Ka?



456 feet

.1 miles

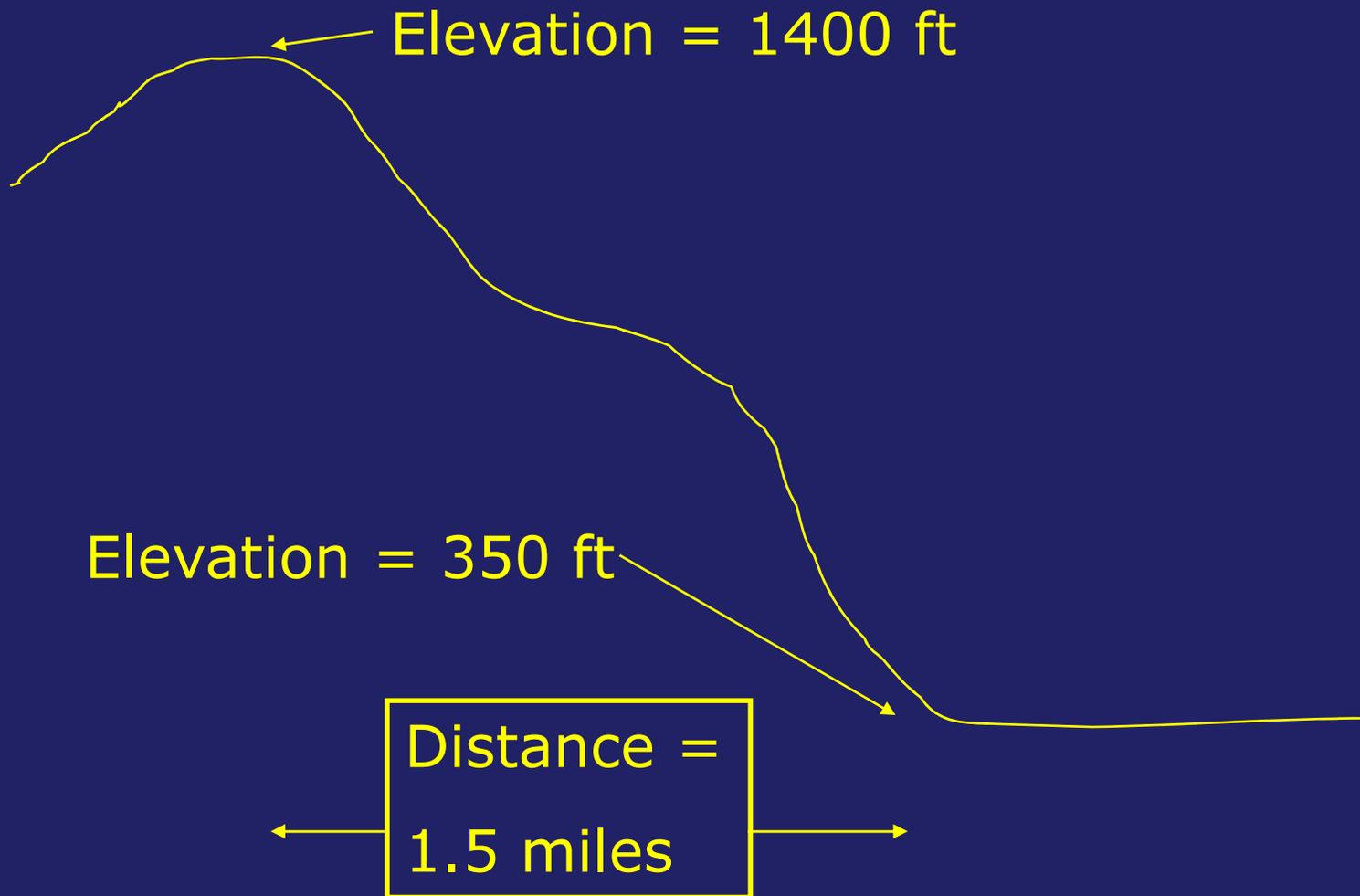


- <http://www.youtube.com/watch?v=n8daM-D43uk>

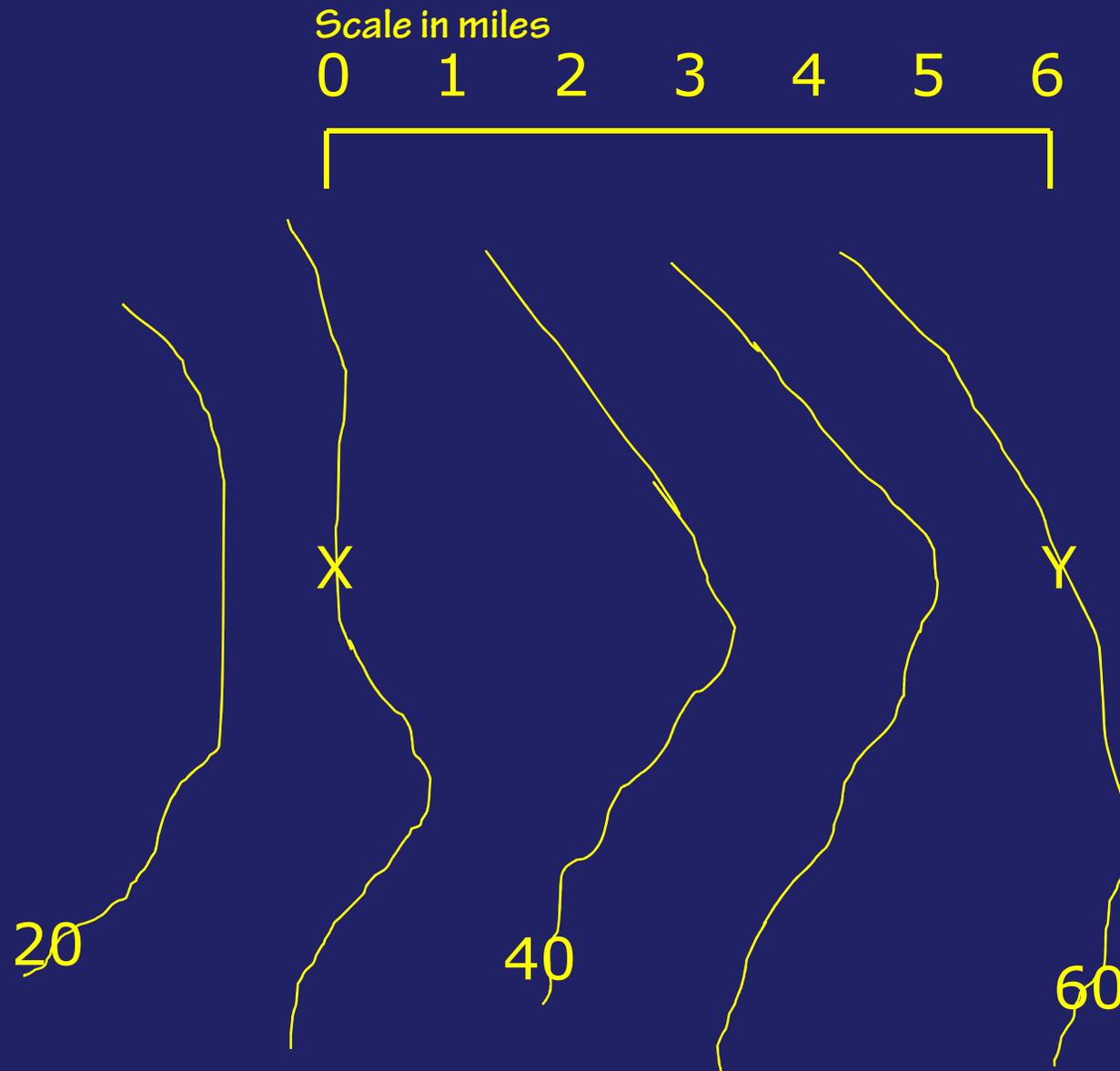
Do now:

As you hike a 6 mile trail, your elevation changes from 1400 ft to 2600 ft. What is the gradient of the trail?

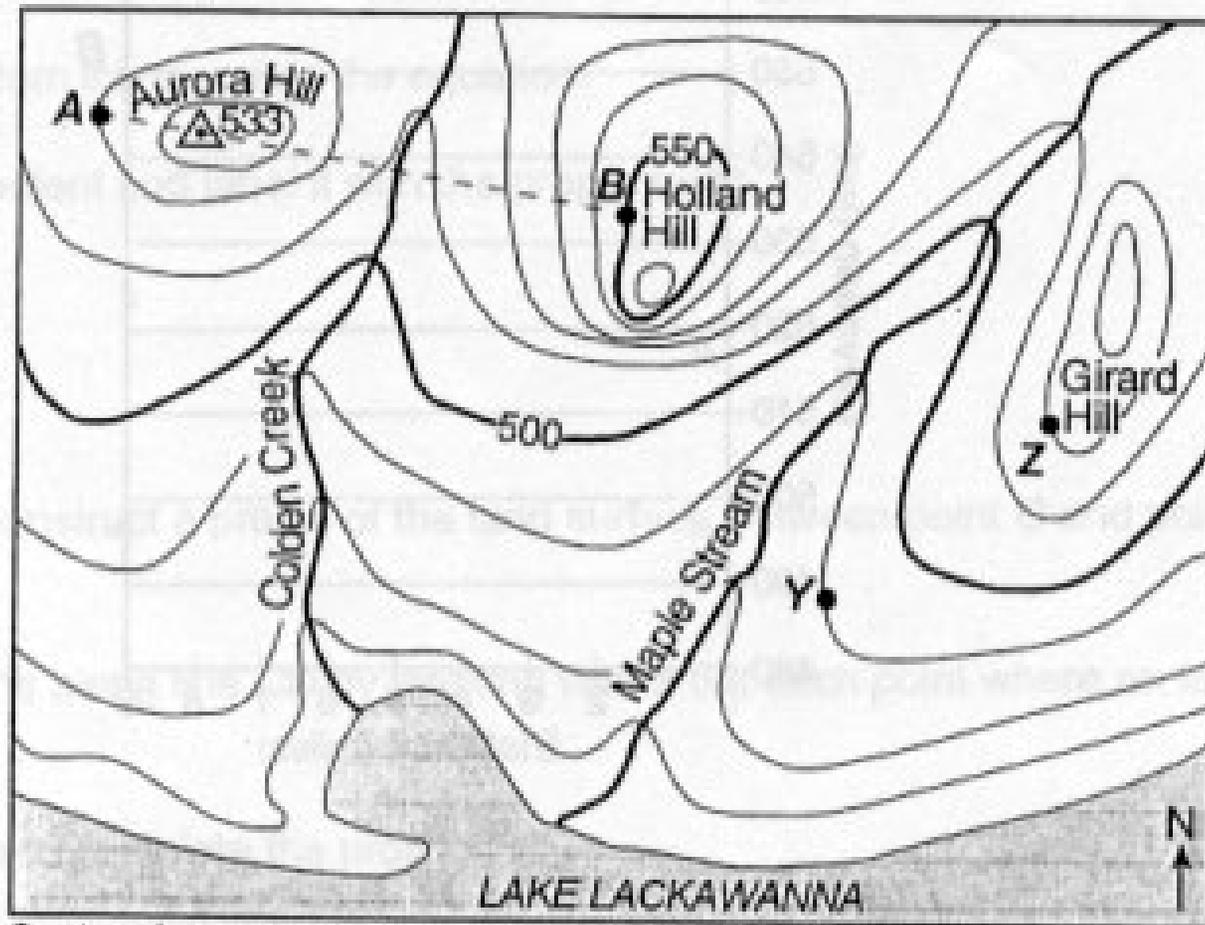
What is the gradient of this ski slope?



What is the gradient between points X and Y?

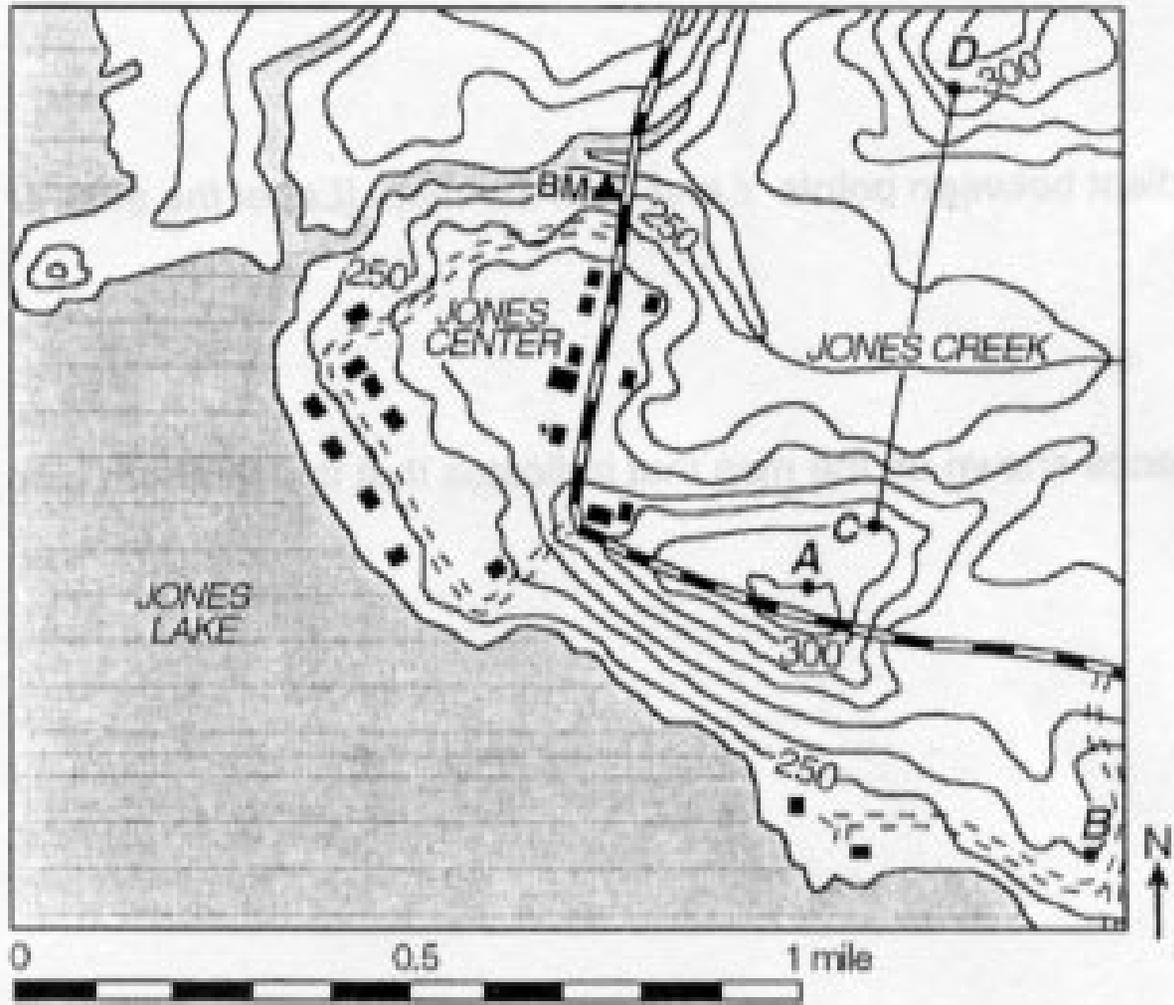


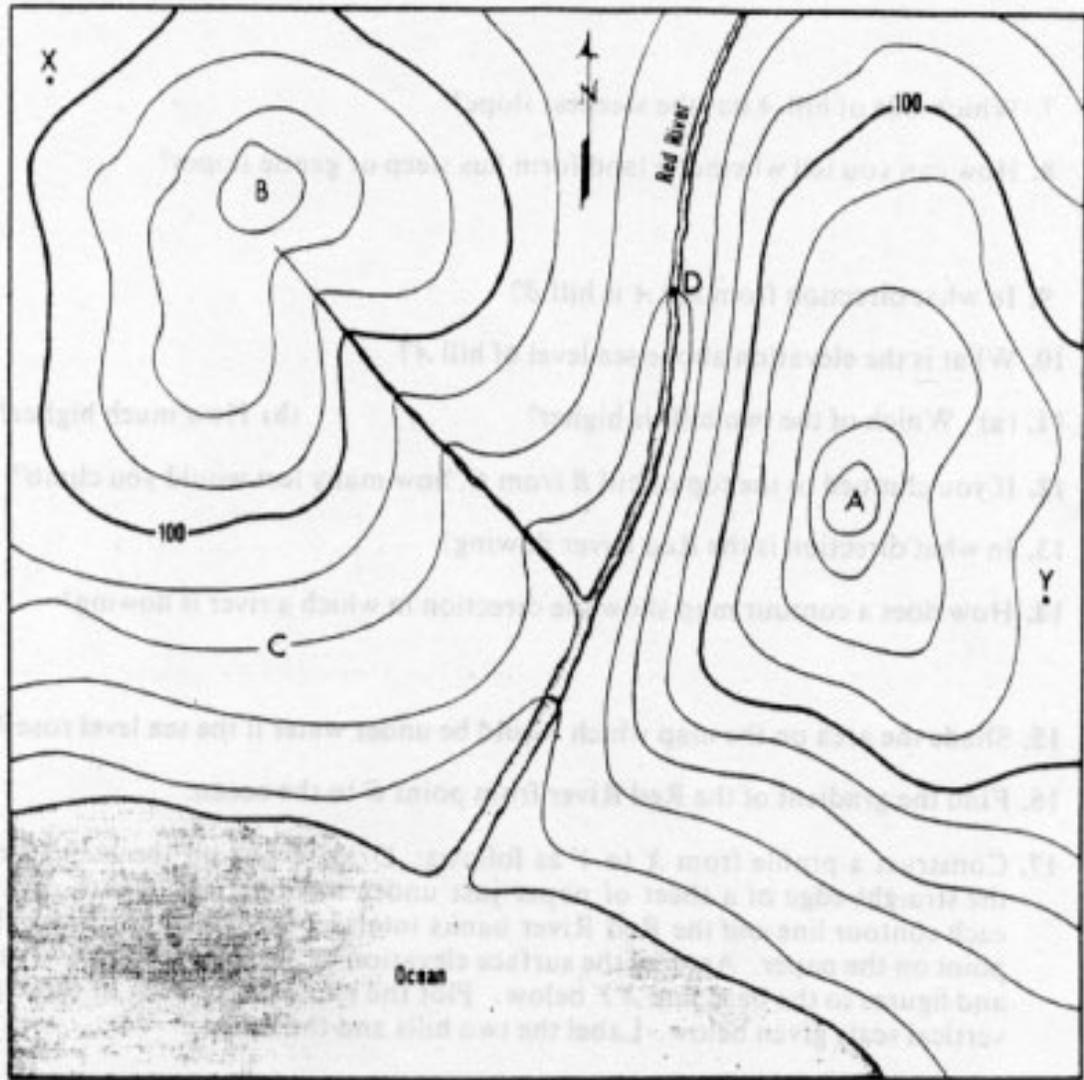
highest elevation on Aurora Hill.



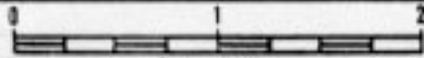
Contour Interval = 10 ft

0 2 4 6 mi



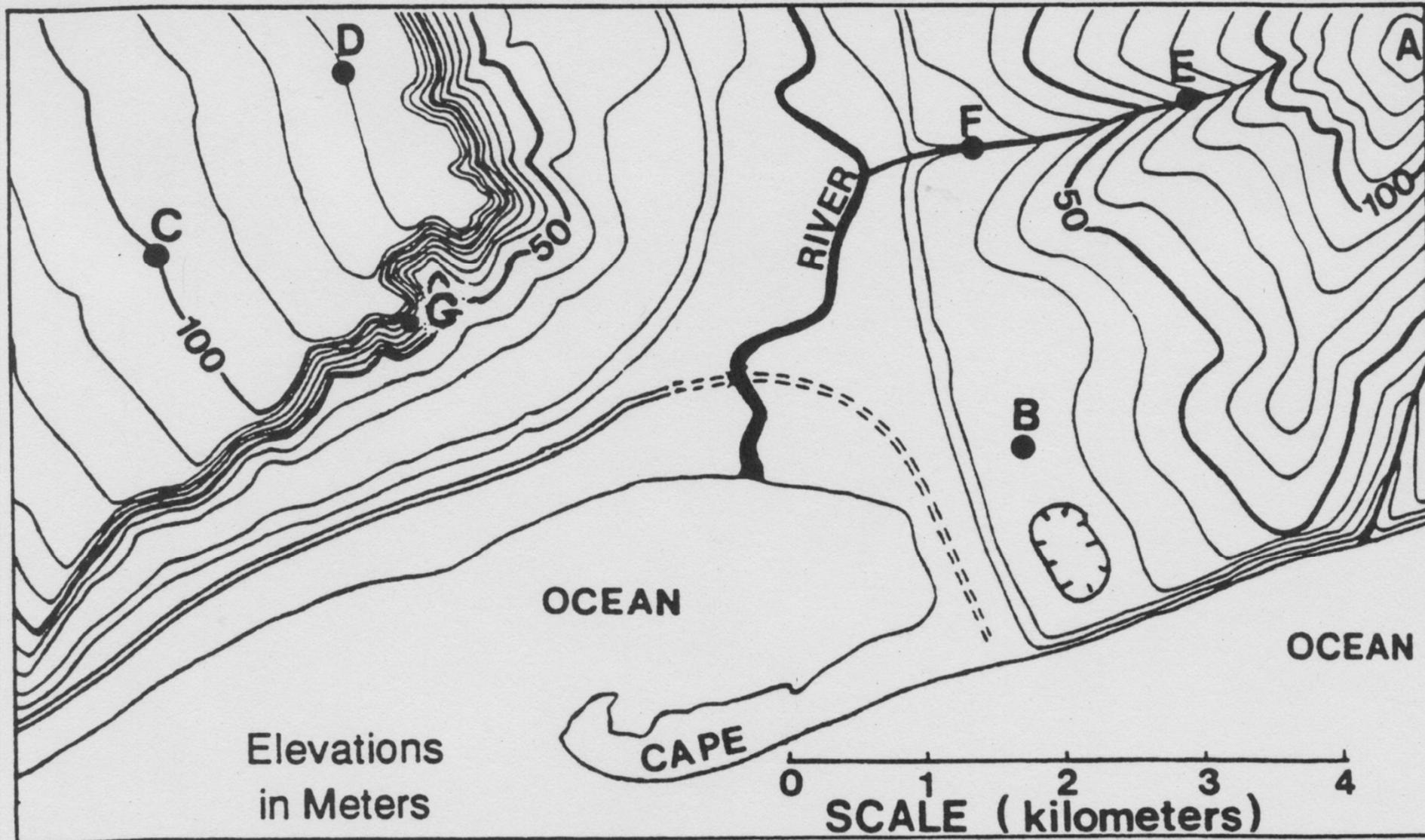


Contour Interval 20'



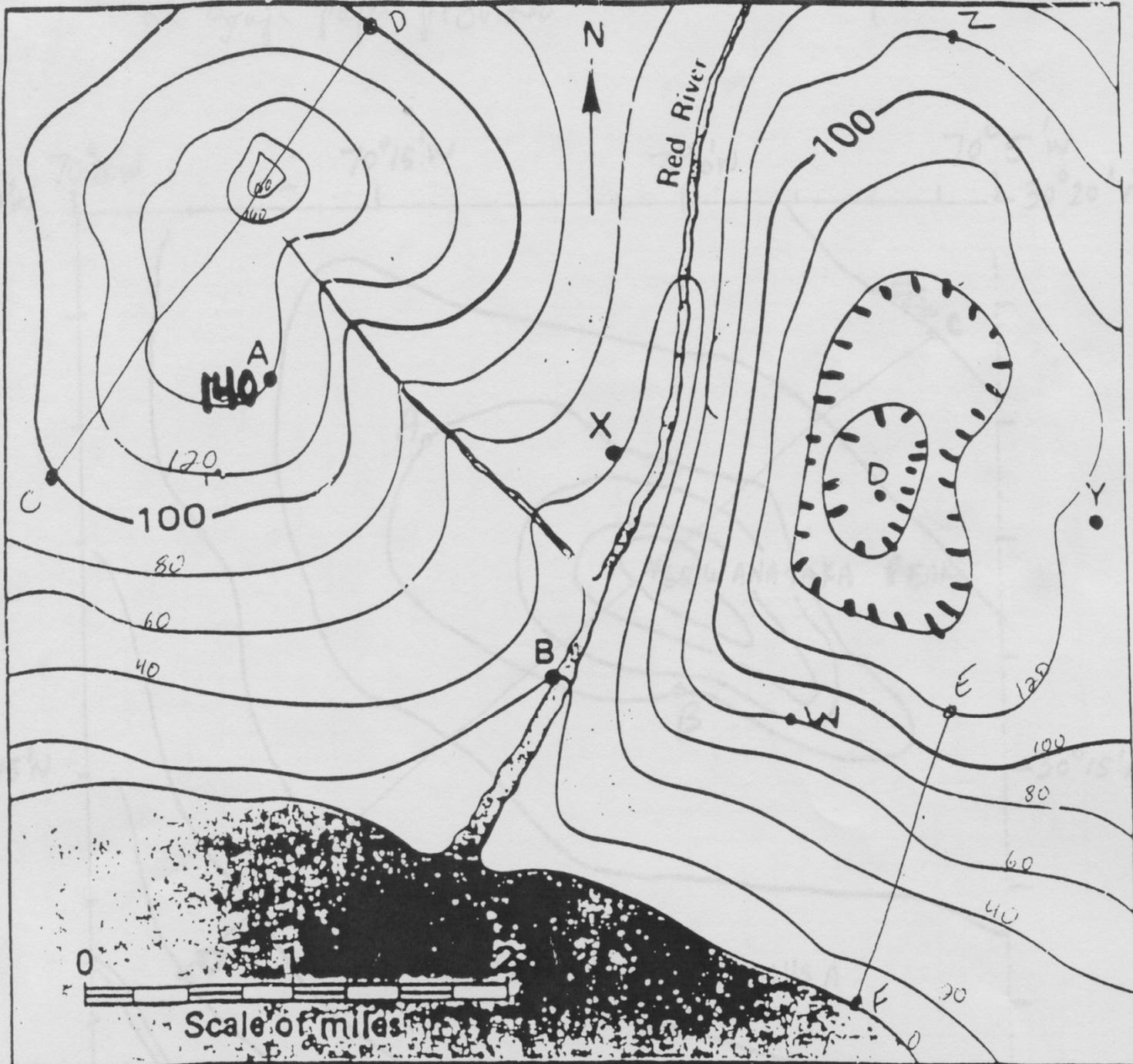
Scale of Miles

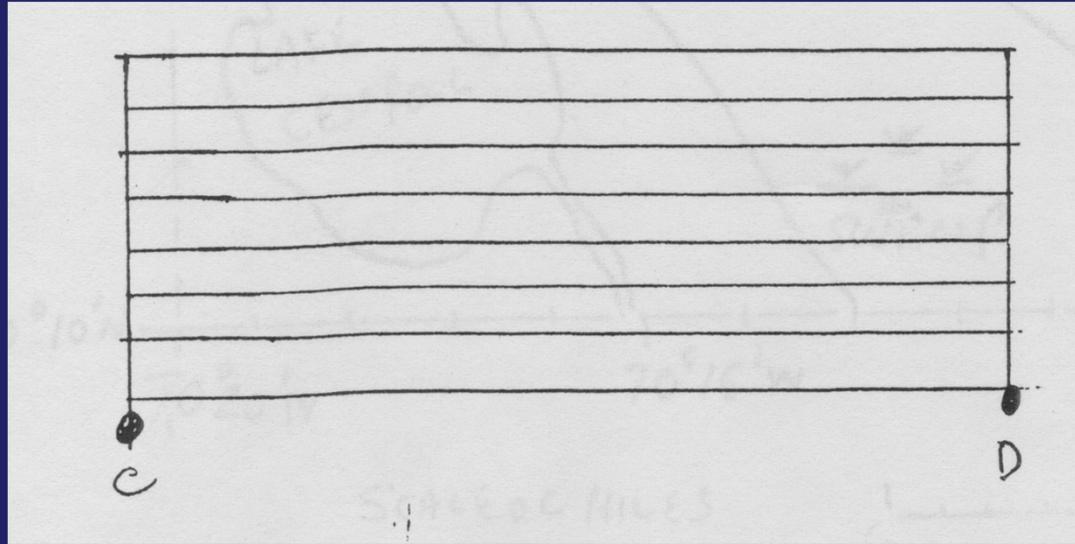
1:63,360

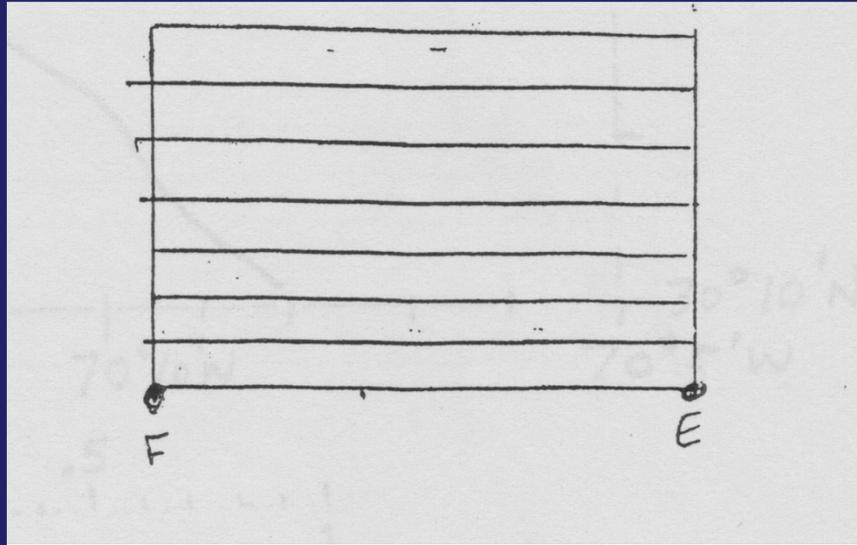


Profile:

--side view of topo map







# Unit 1b Review

- 1) Know different field types (isotherms, contour lines, etc.)
- 2) Review longitude and latitude
- 3) Know how to draw isolines

# Unit 1b Review

## 4) Know topo map rules

- river ("v" points upstream)
- depression (contour line number repeats)
- steep gradient (lines close together)
- gentle gradient (lines far apart)

# Unit 1b Review

5) Know how to make a profile

6) Know how to do a gradient problem  
(4 steps)

