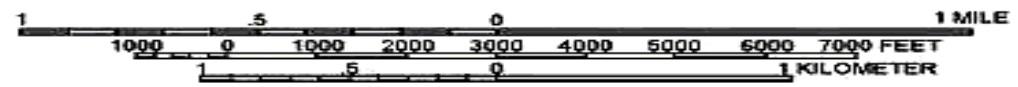
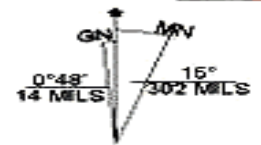
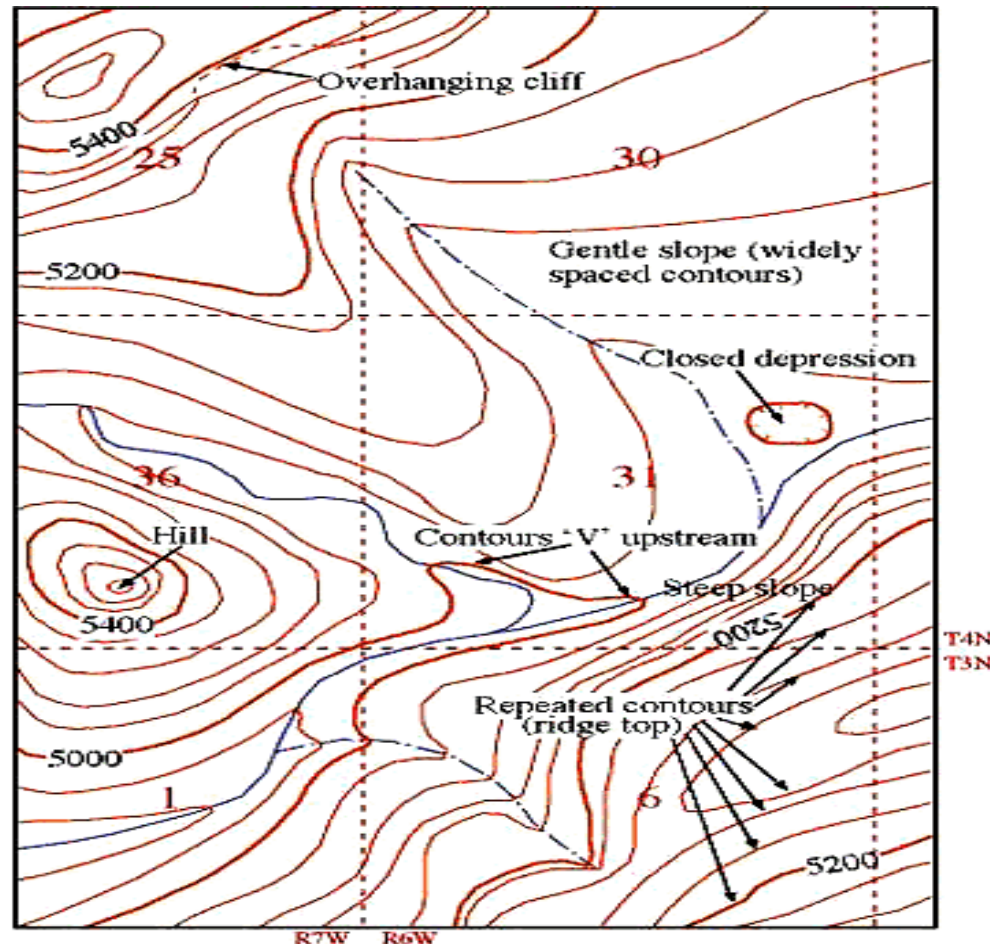


Topographic Maps

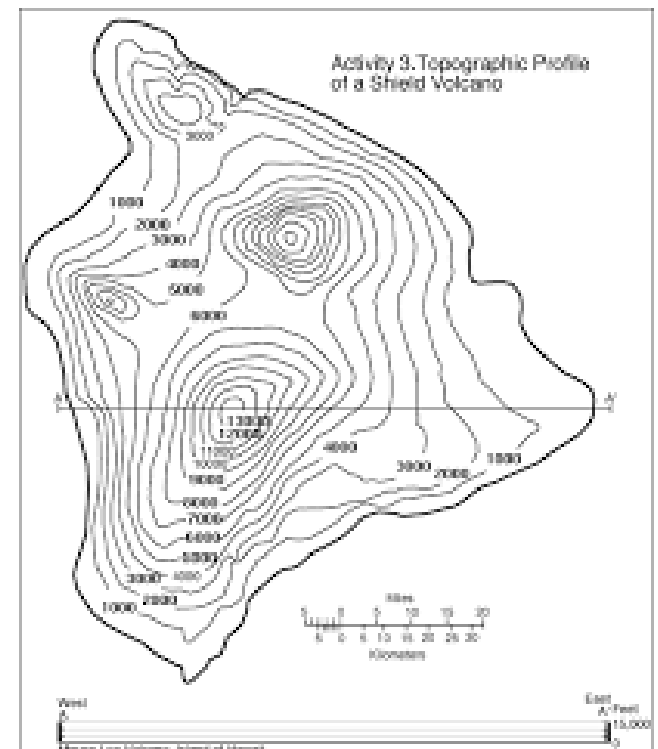


UTM GRID AND 1968 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
SUPPLEMENTARY CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Topography

- From Greek *topos*, “place” and *grapho*, “write”
- the study of surface shape and features of the Earth and other planetary bodies.
- Depiction in maps.
- Person whom makes maps is called a cartographer.



What is a Topographic Map?

- A topographic map, also known as a contour map, is a map that shows the shape of the land using contour lines.
- It is a map that shows an elevation field, meaning how high and low the ground is in relation to sea level.



What are contour lines?

- **Contours** are imaginary lines that join points of equal elevation above or below sea level.
- They show the exact elevation, the shape of the land, and the steepness of the land's slope.
- Contour lines never touch or cross.

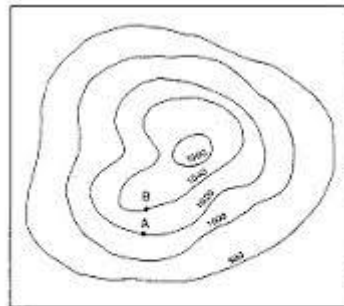
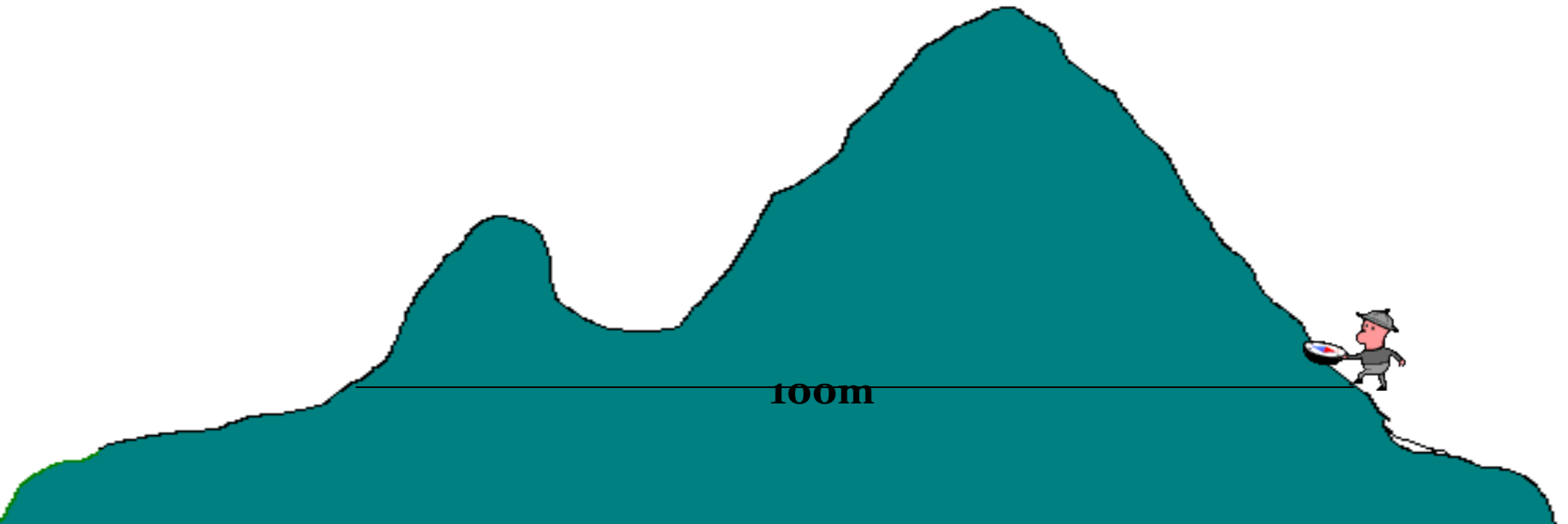
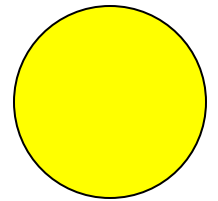


Figure E-1: Isolated Hill

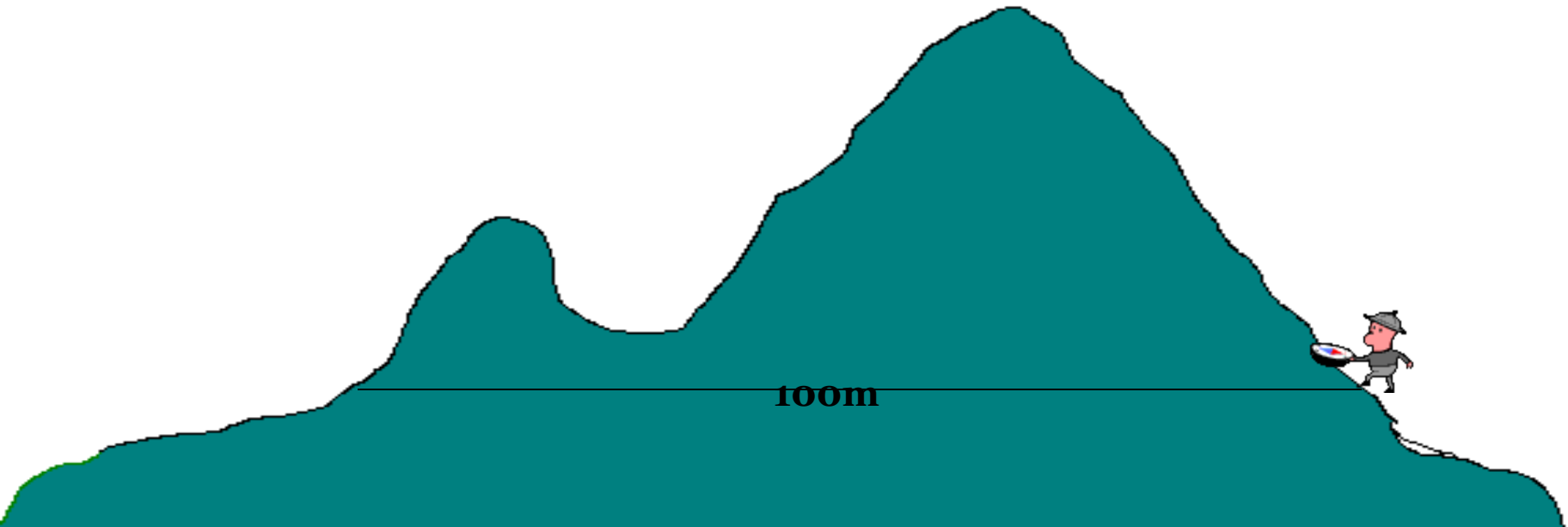
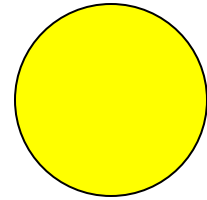
Let's take a walk up a hill!



We're now at an elevation of 100 meters.

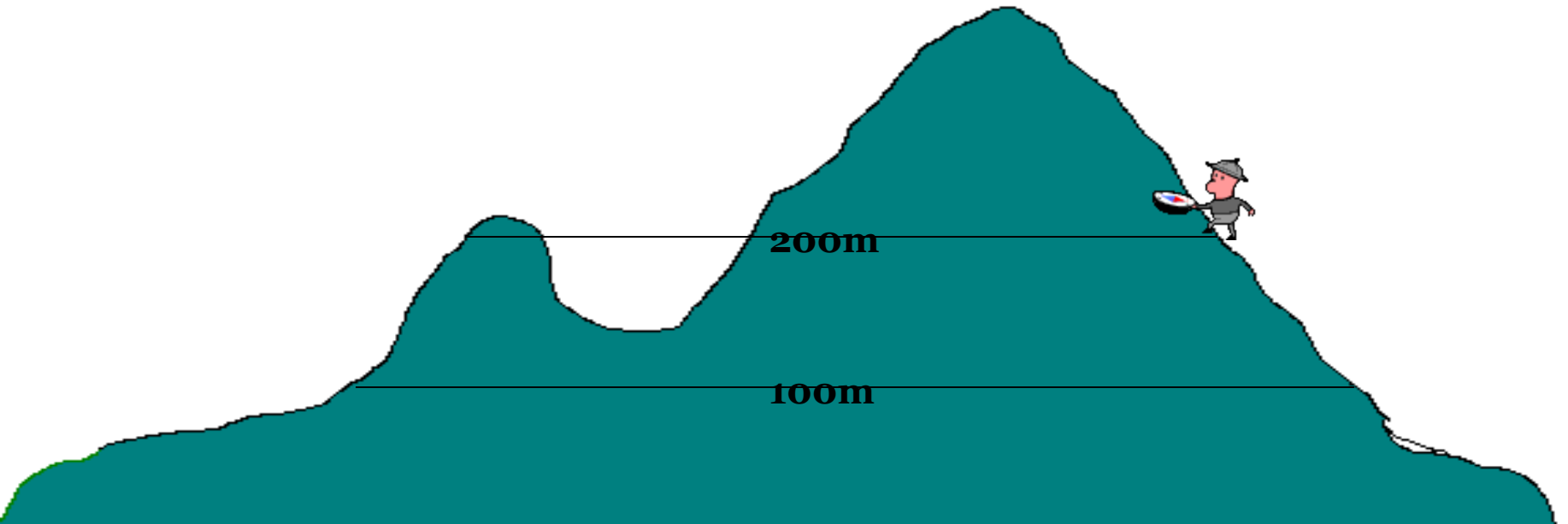
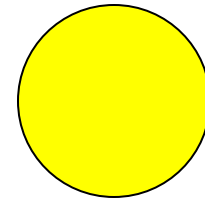


Let's keep going!

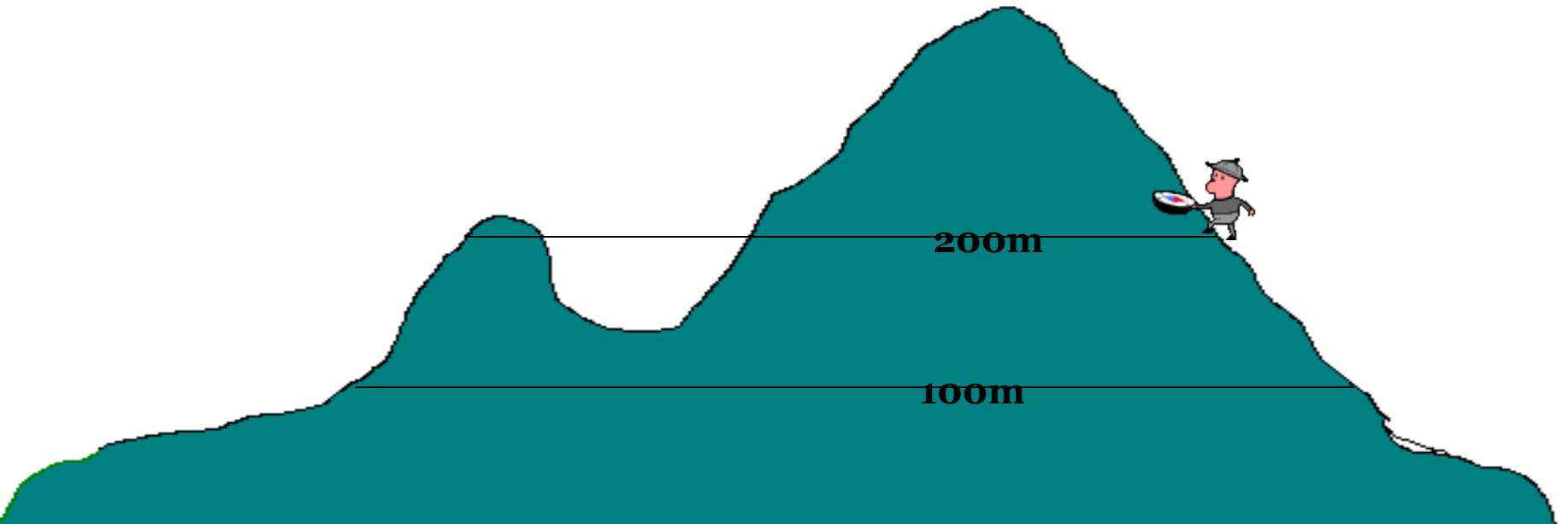
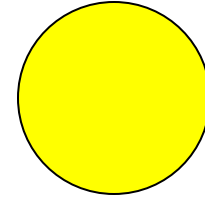


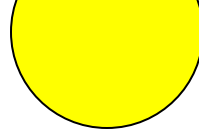
100m

Now we're at 200m.

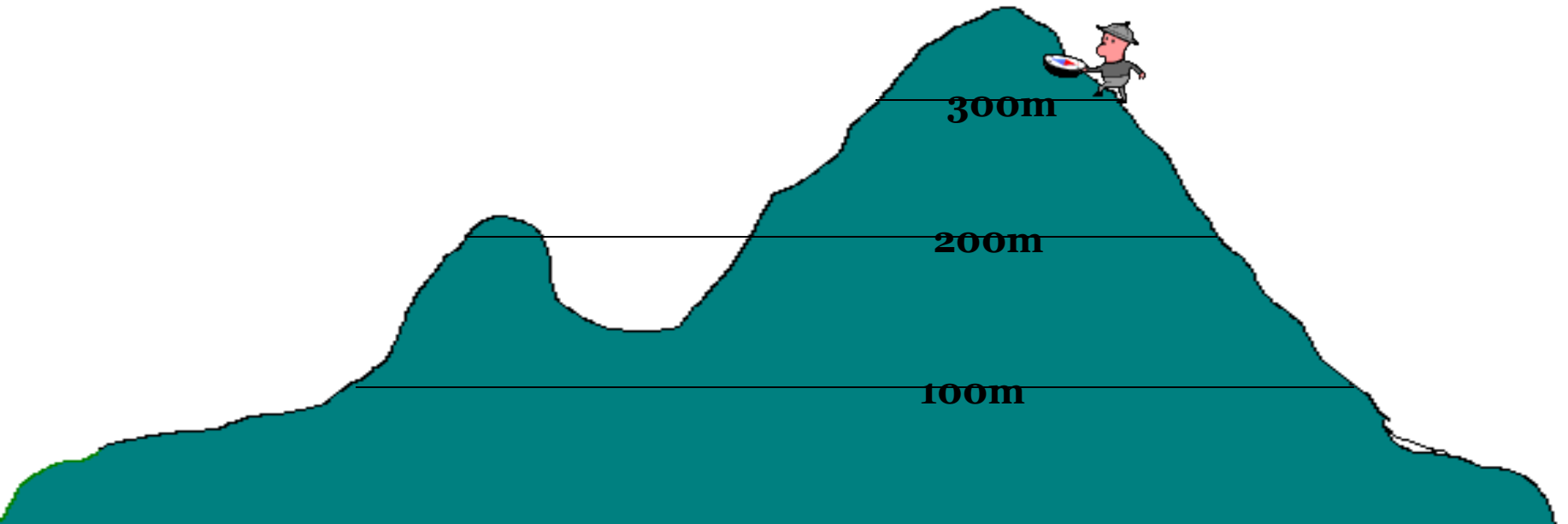


Shall we march on?

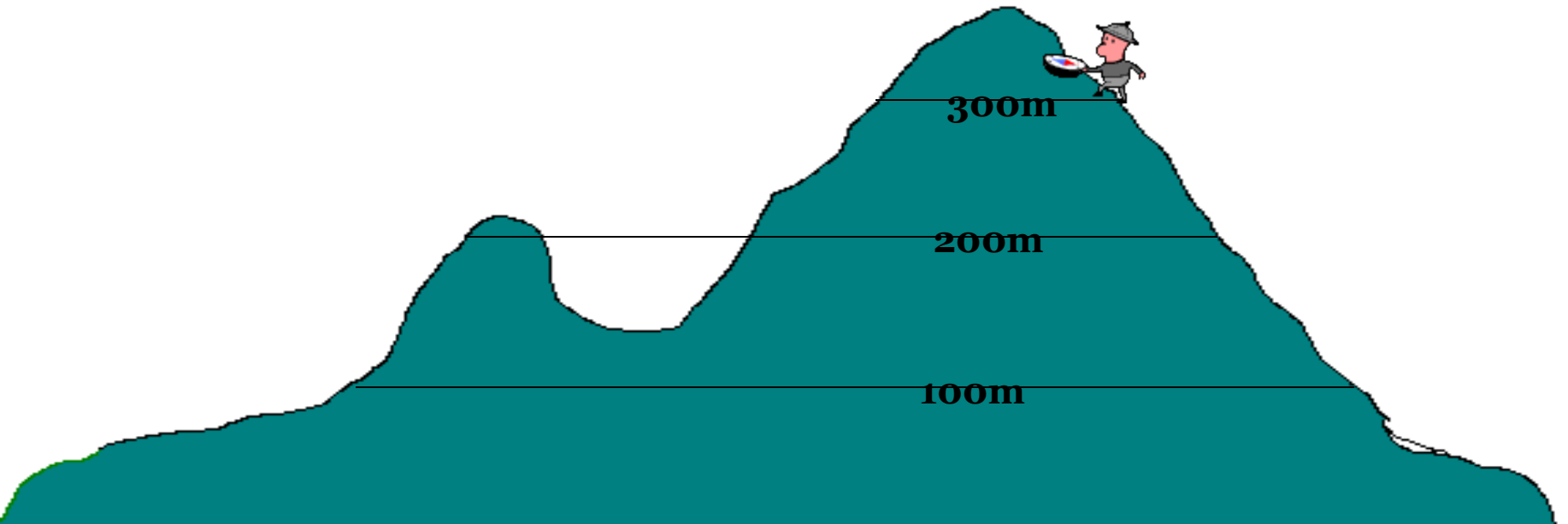




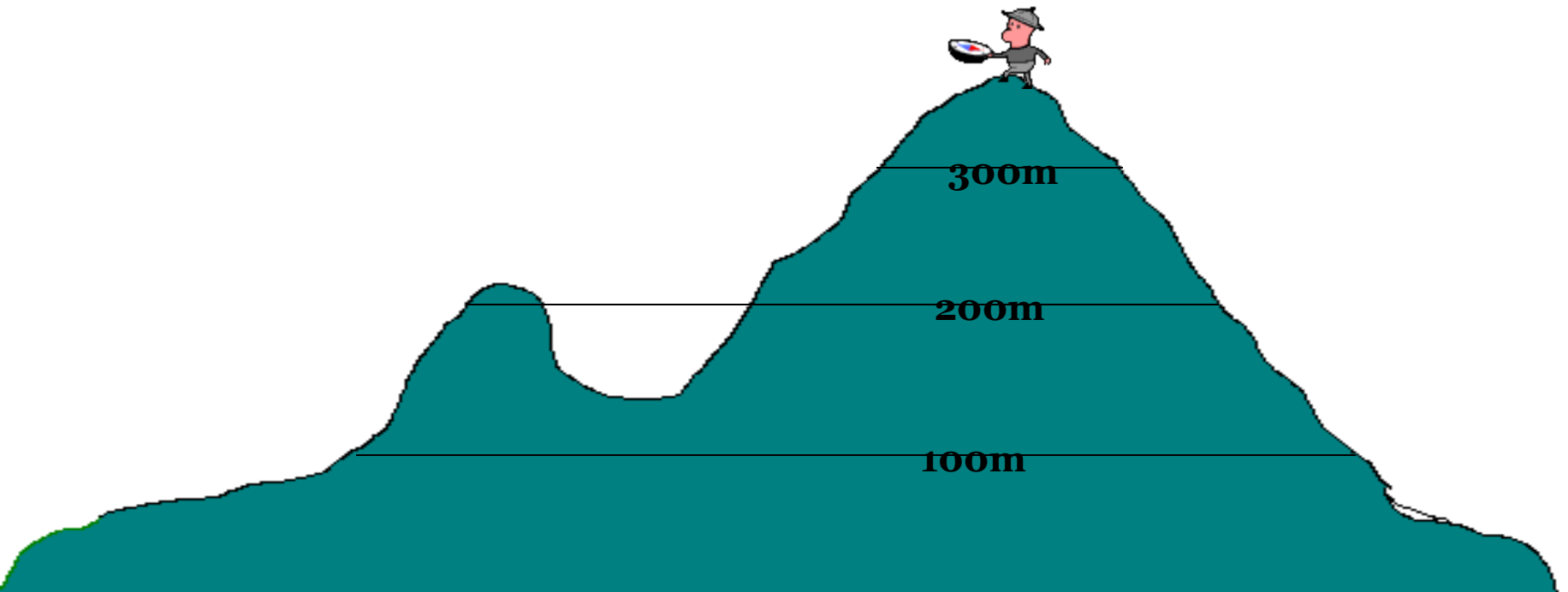
We've made it to 300m!

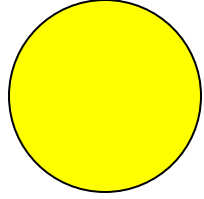


On to the peak!



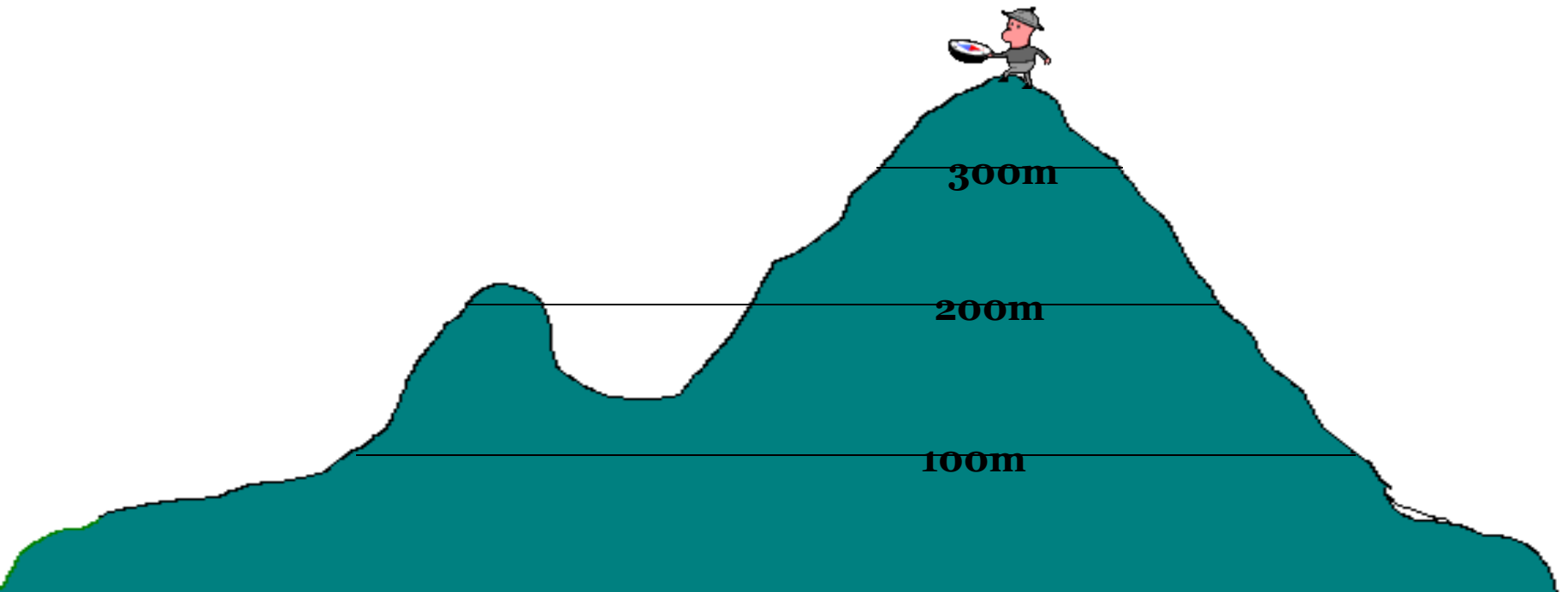
We're on the peak, but what's our elevation?

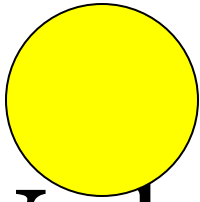




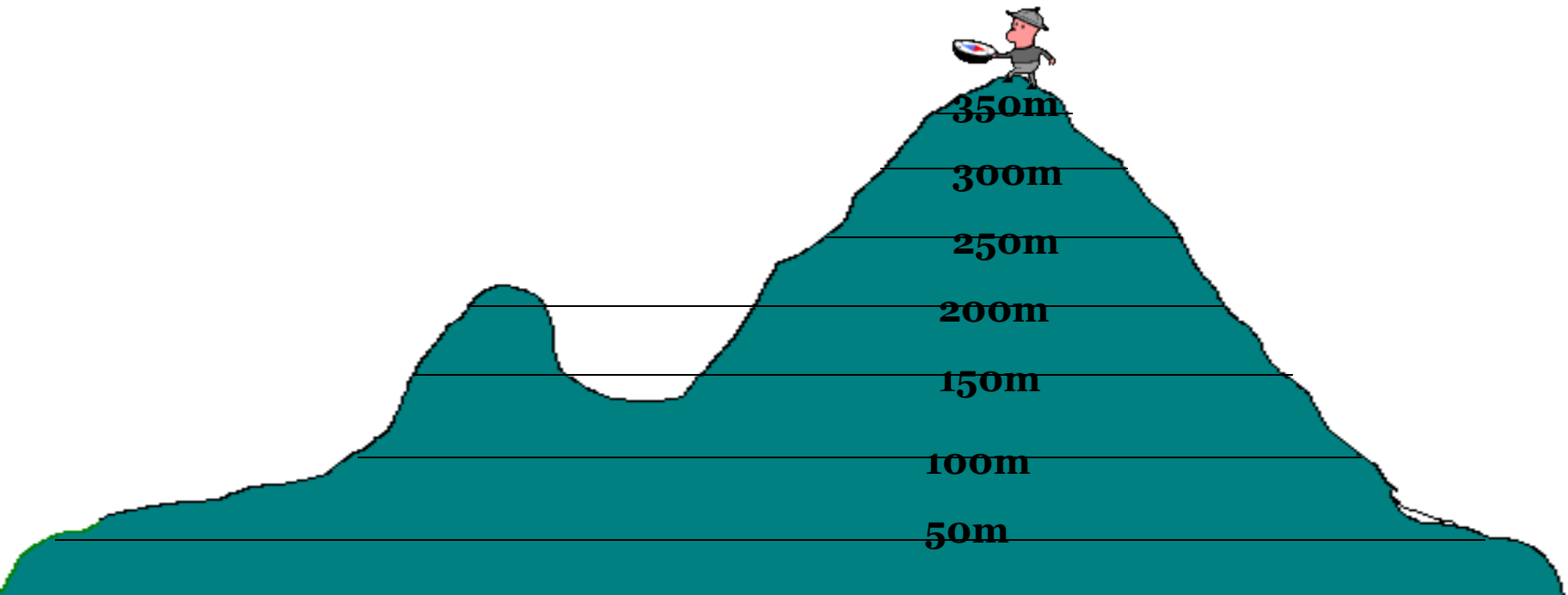
Any ideas?

Let's add contour lines for every 50 meters and see if that helps.

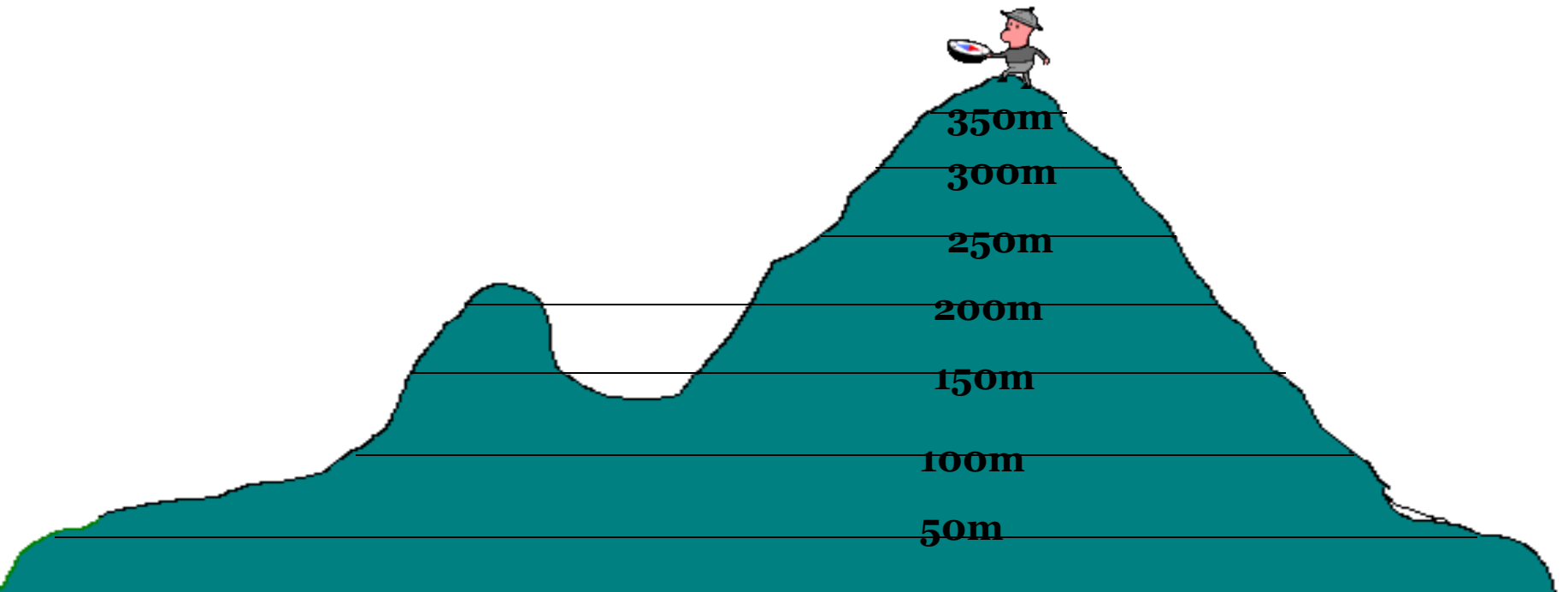
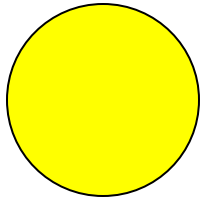




We know that we are above 350m, but less than 400m.

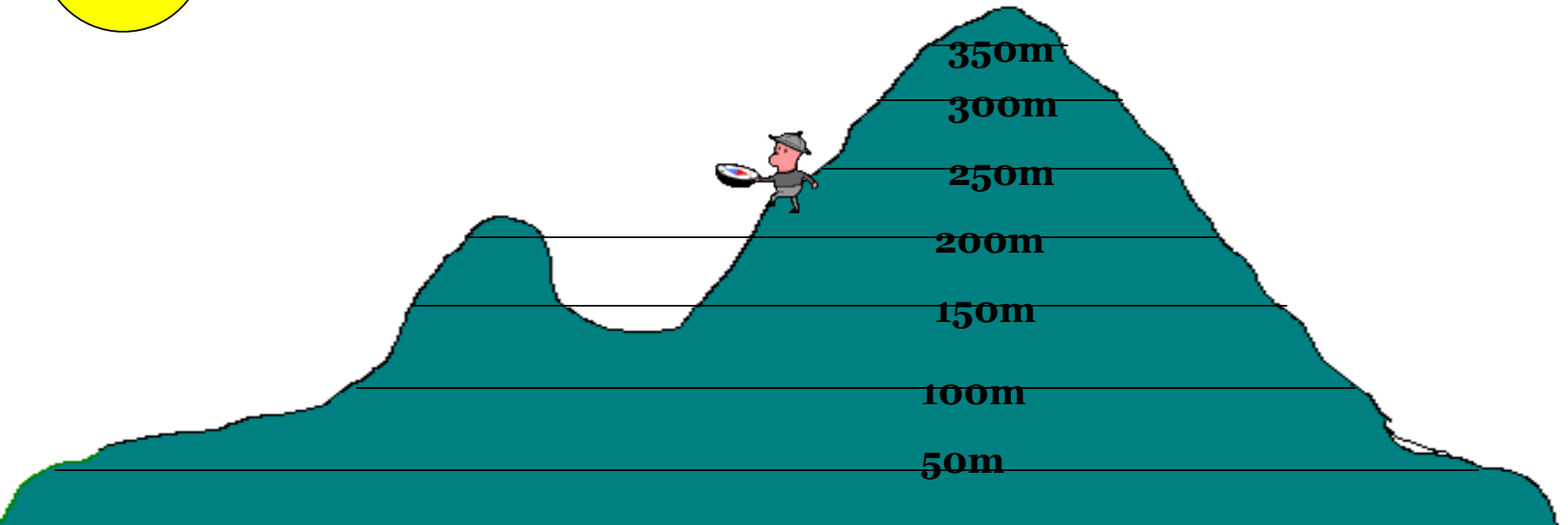
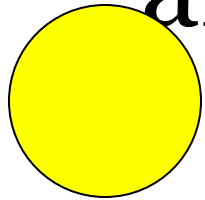


Let's head down the hill, it's getting late!

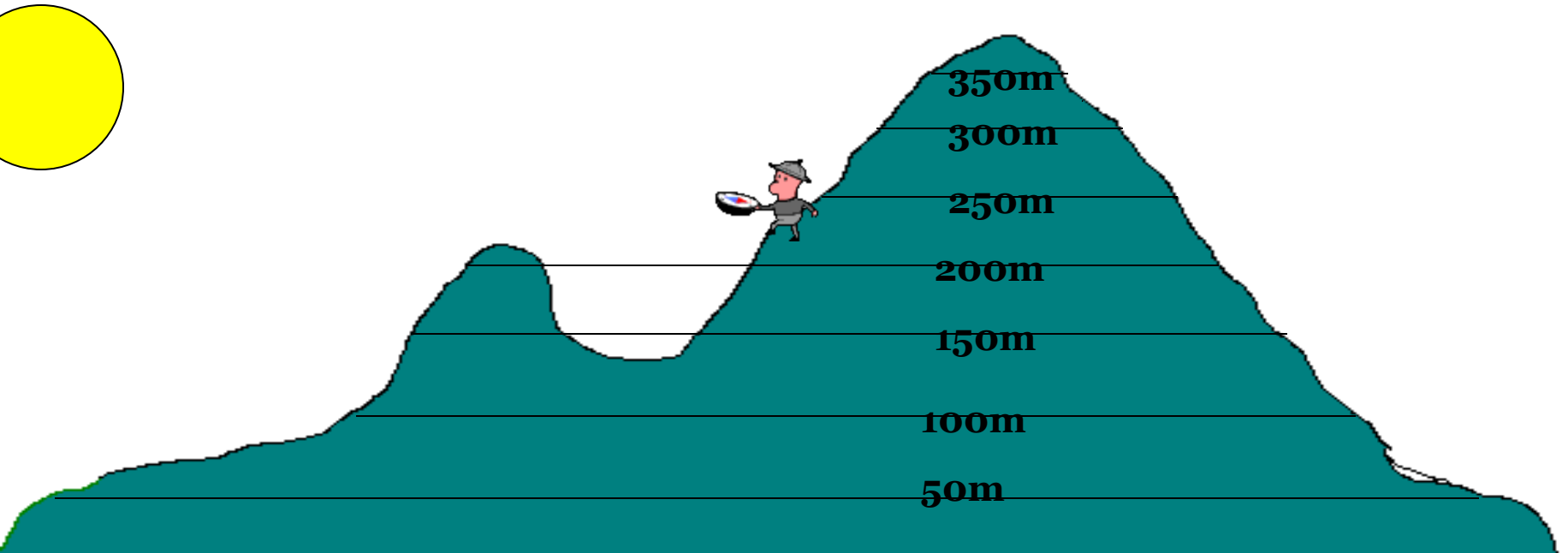


Now what's our elevation?

If you said somewhere
between 200m and 250m you
are right!

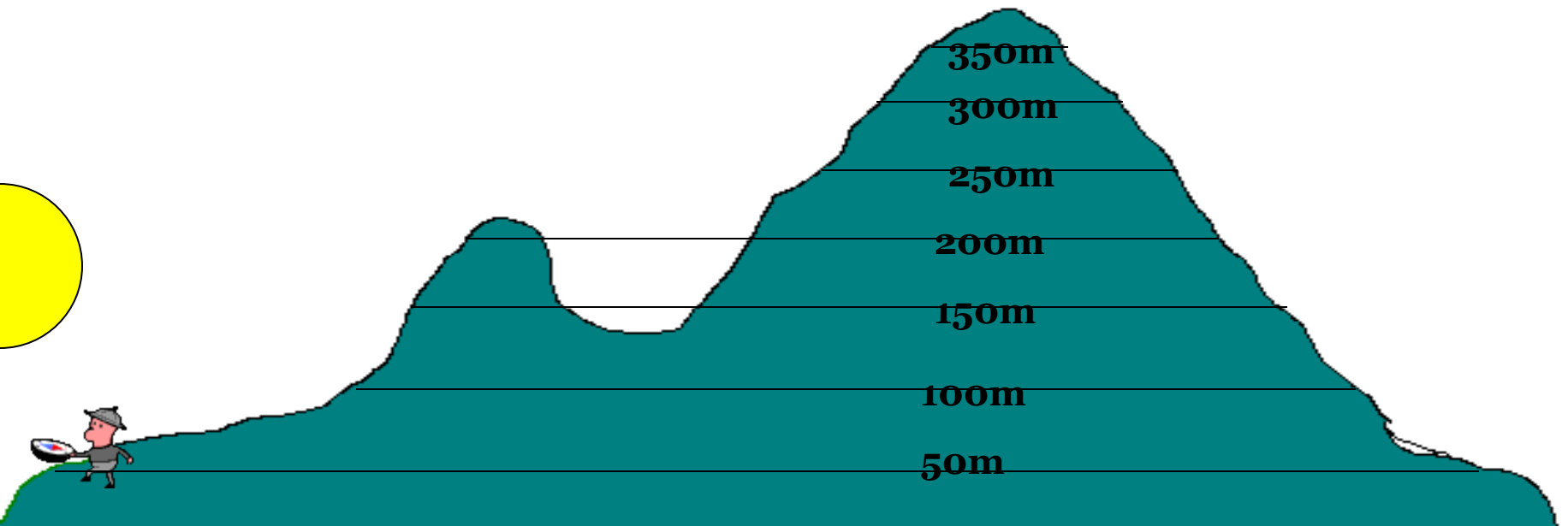


Let's try this again!



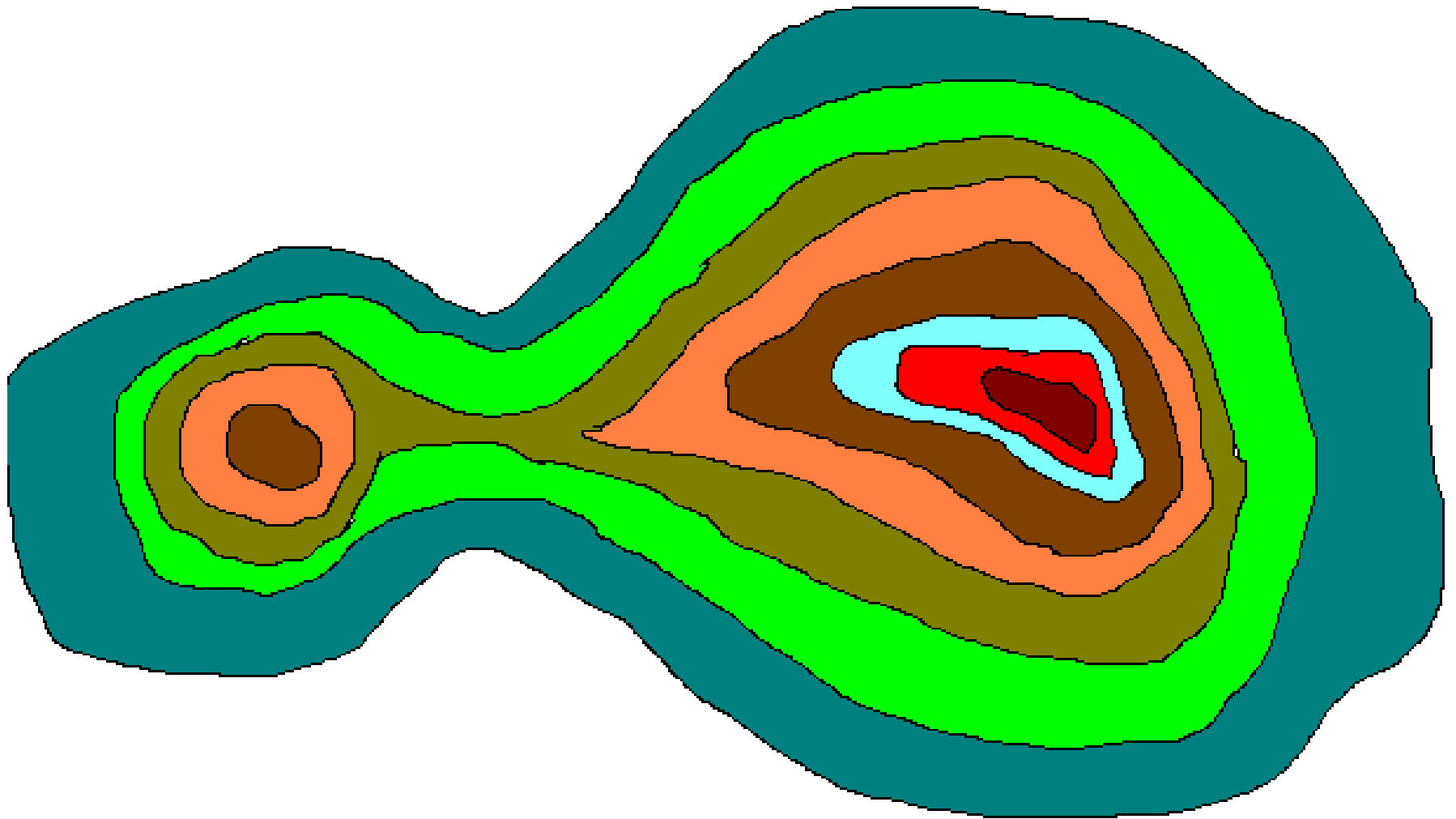
What's our elevation now?

If you said 50m or just under,
you're right!

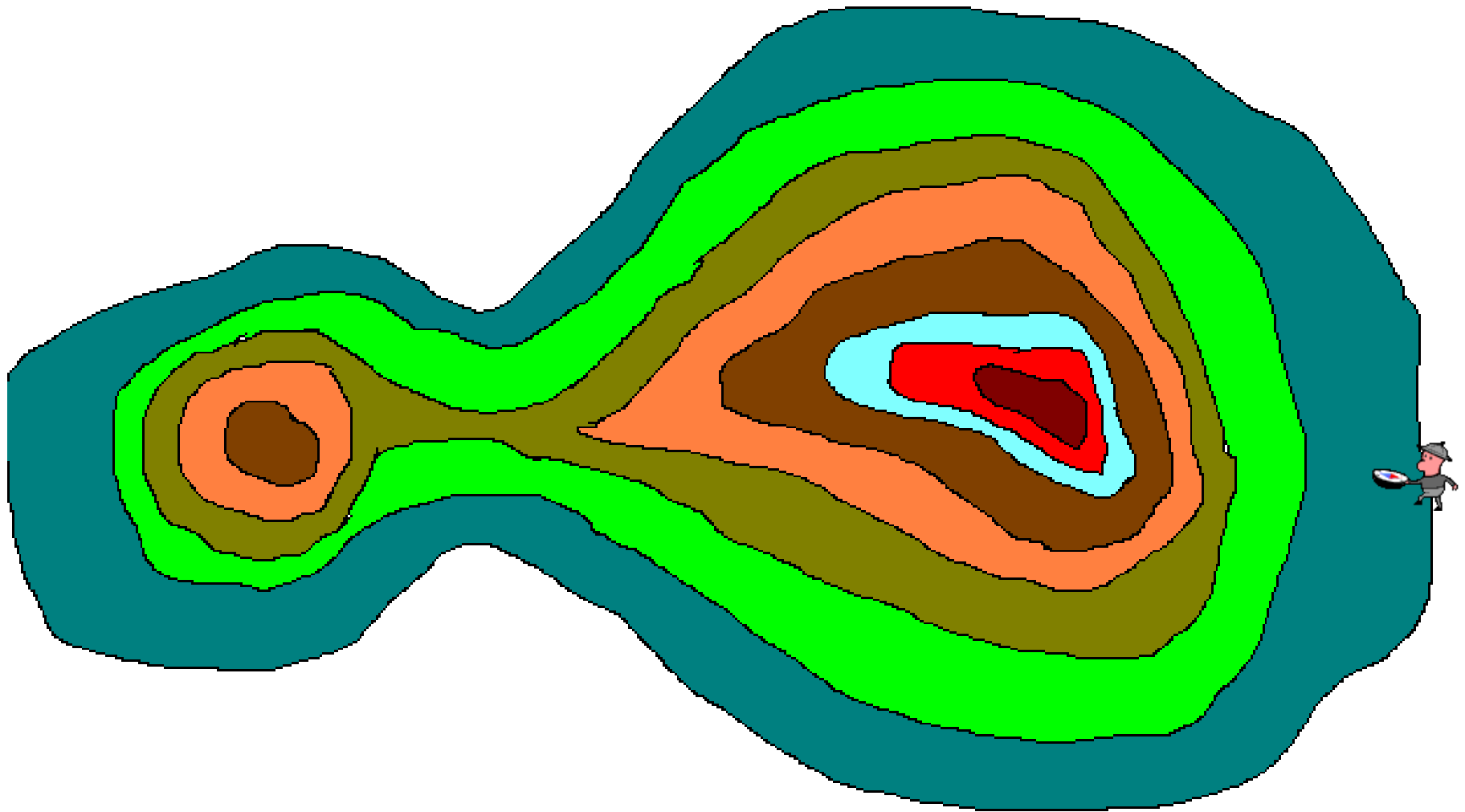


Let's
now look at the
same hill, but the
way we might see it
from an airplane!

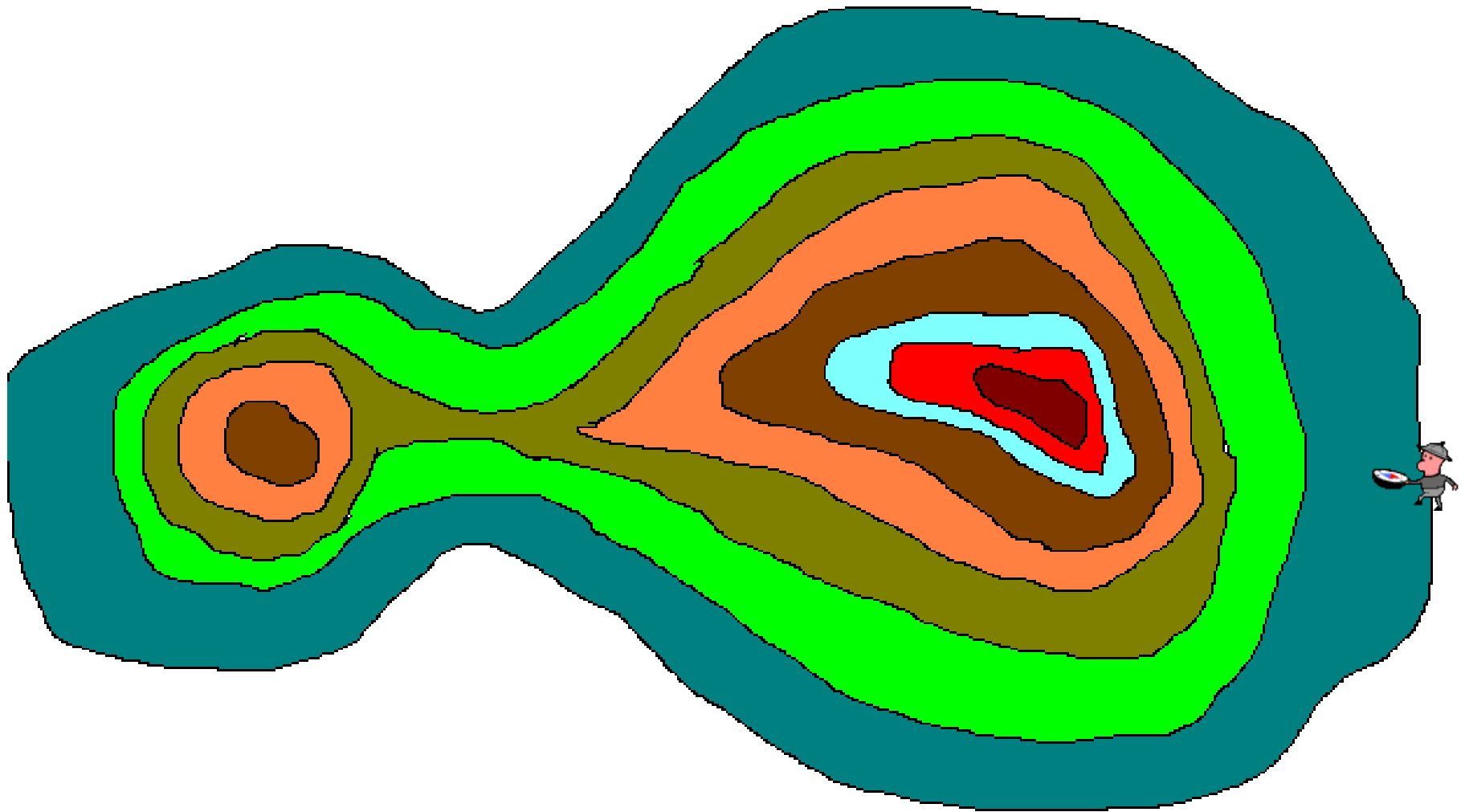
Each color change represents a 50 meter increase.



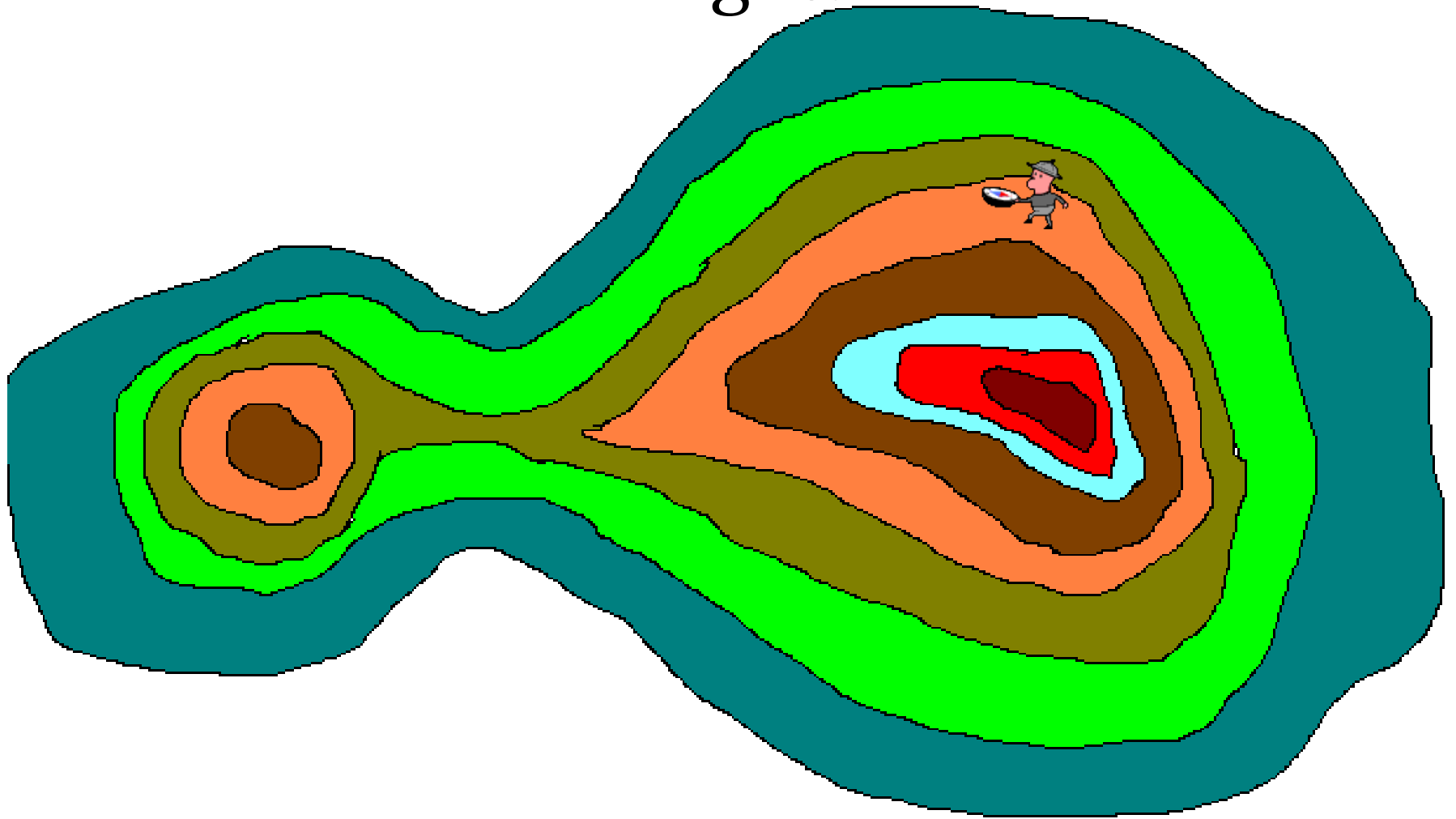
Now, let's try the same hike! Our elevation is 0 meters.



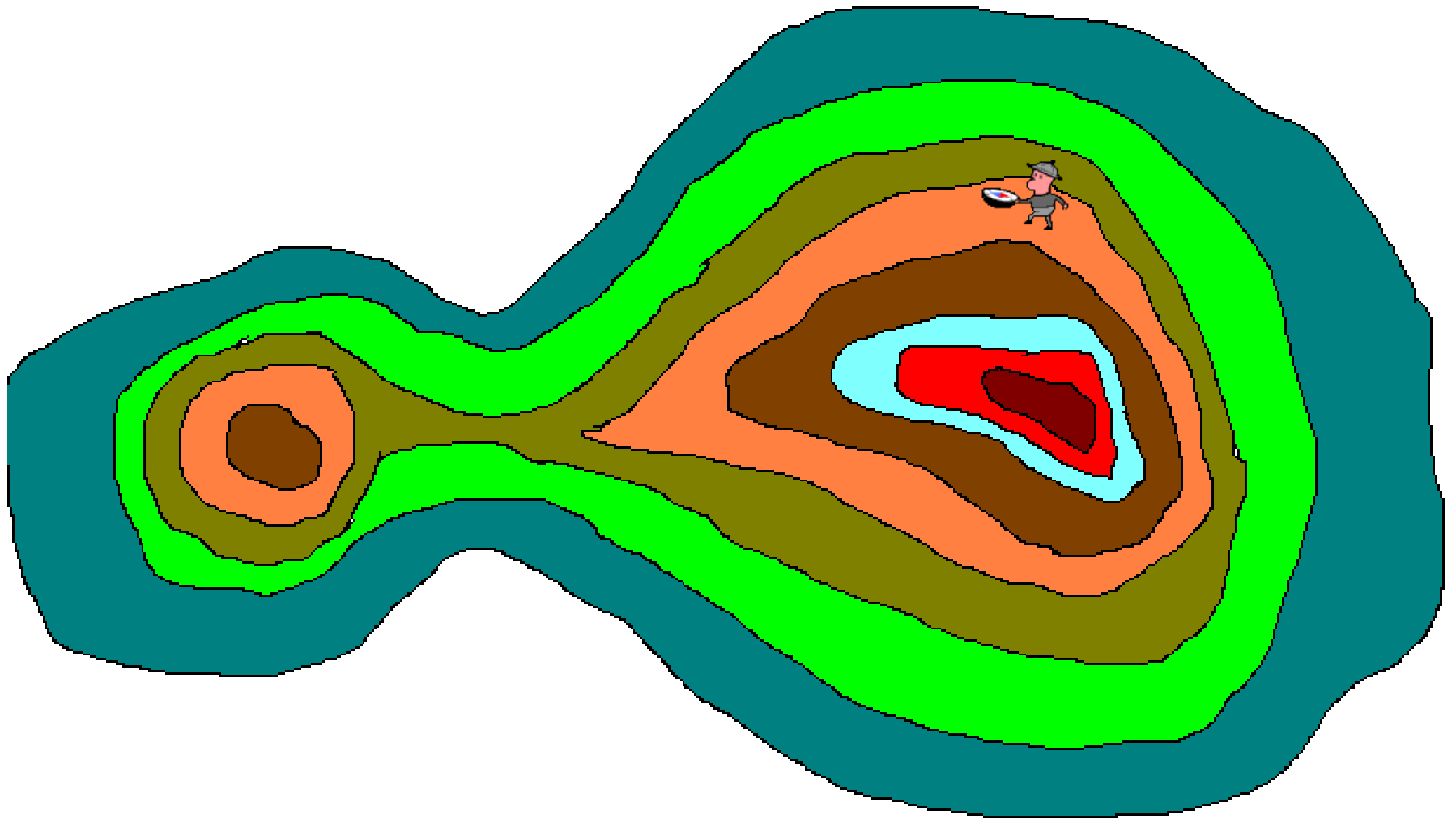
Now what is our elevation?



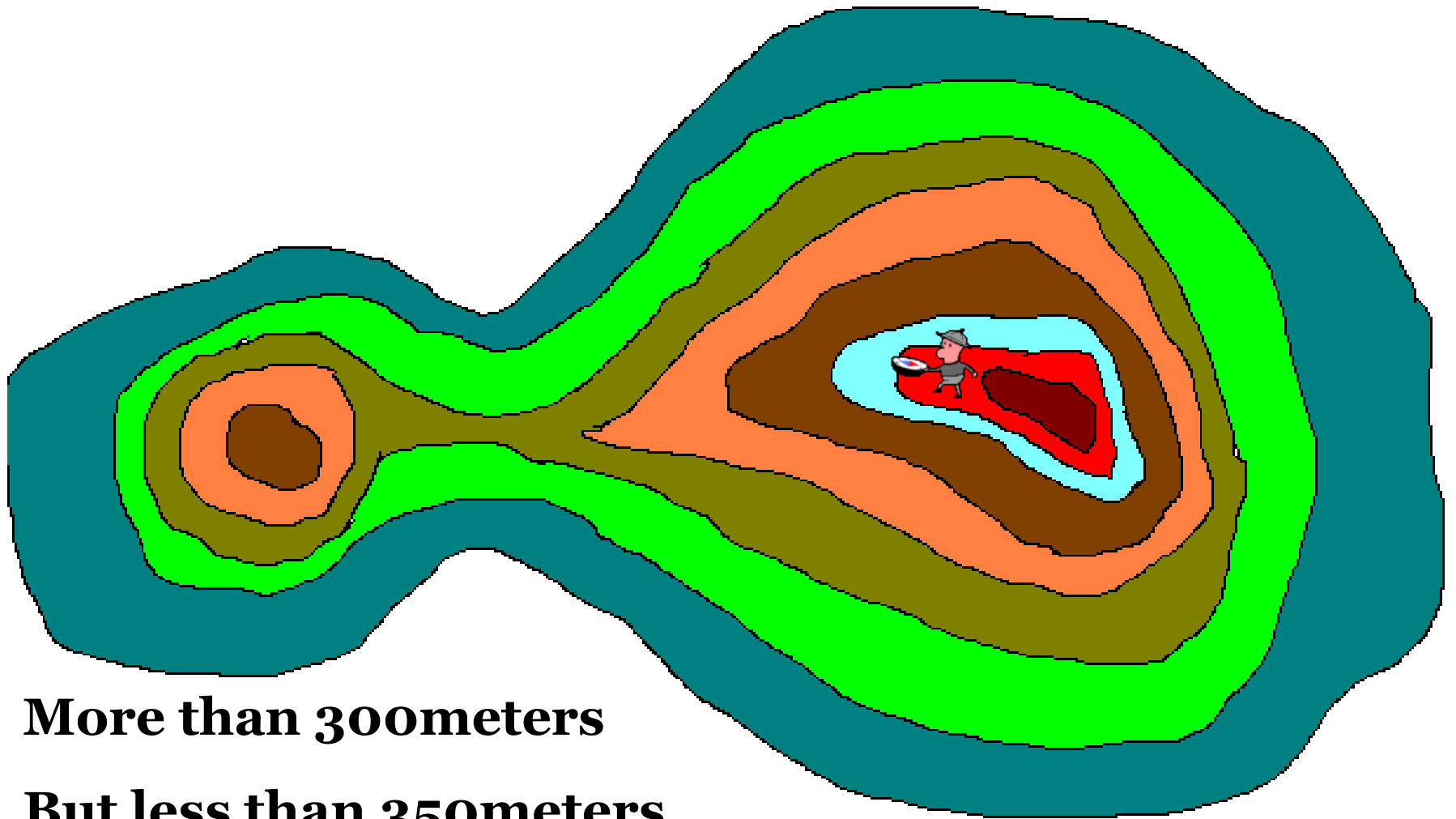
If you said more than 150 meters,
but less than 200 meters your
right!



Let's go a little higher.



Think you know our elevation
now?

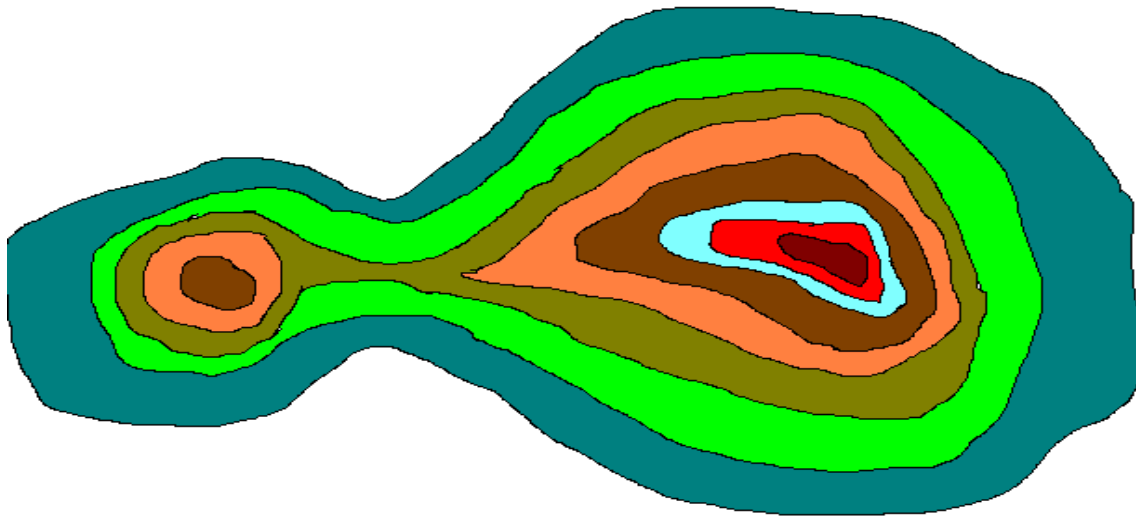


More than 300meters

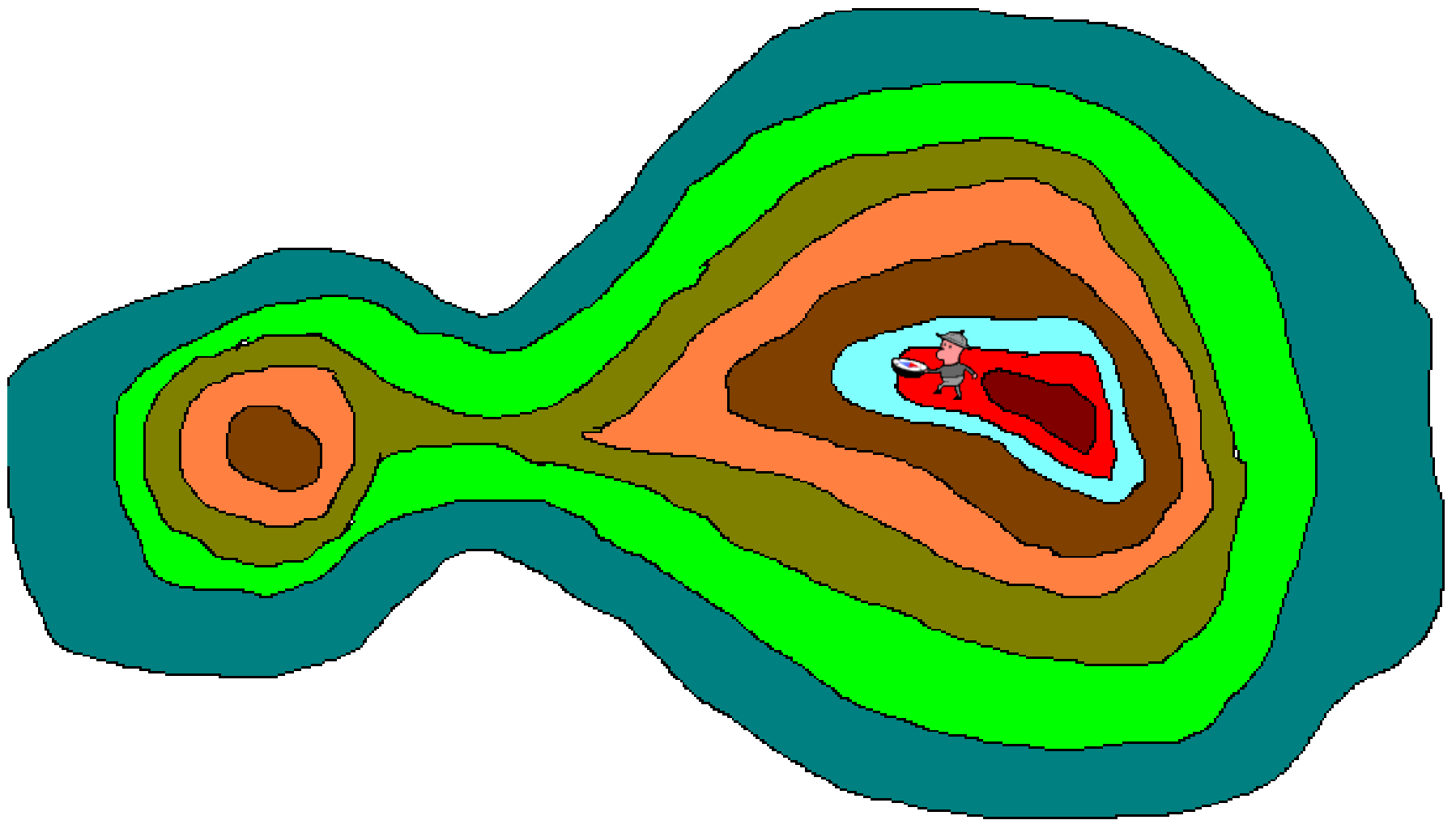
But less than 350meters

If we were standing on the peak,
what would be our elevation?

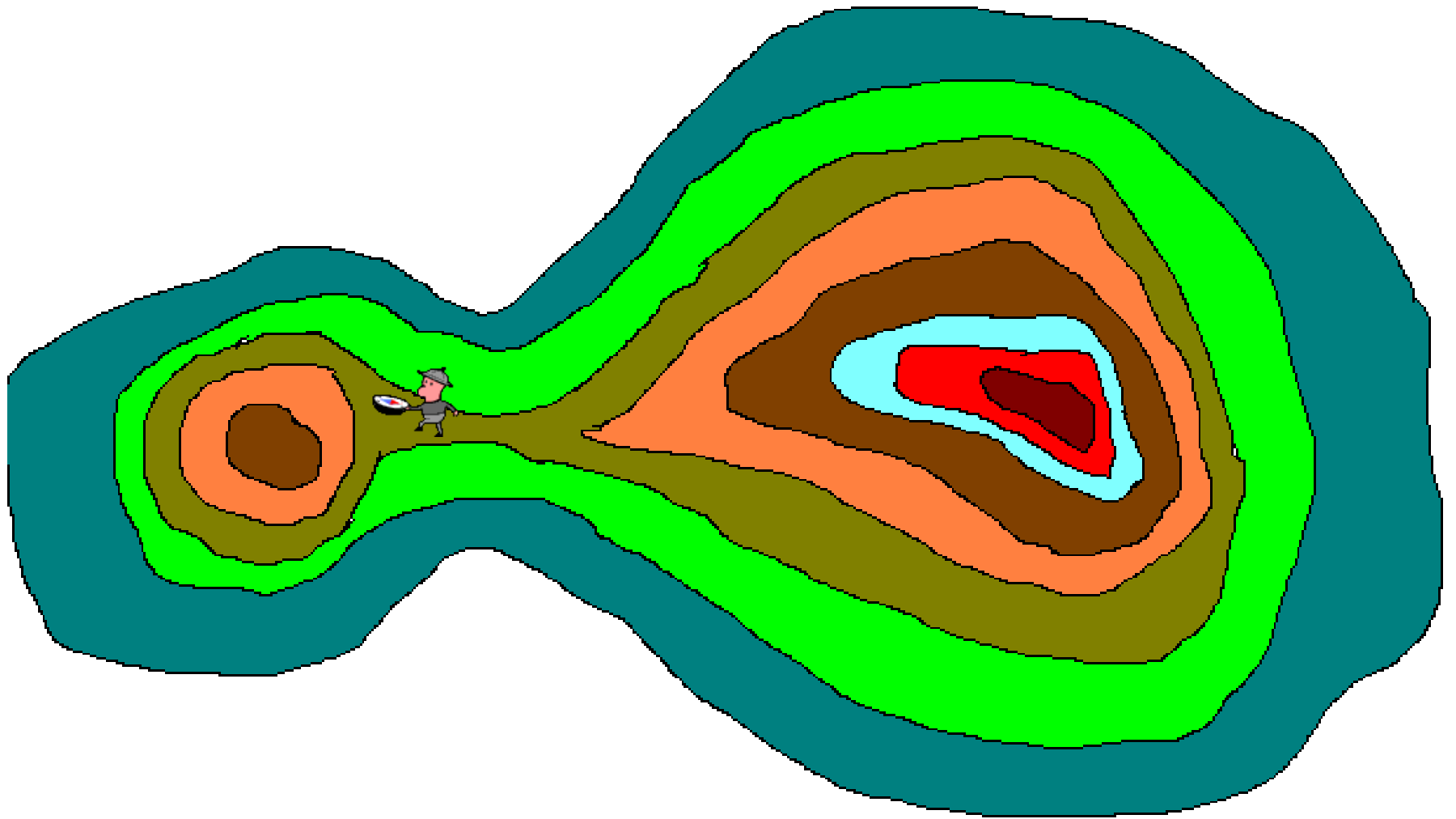
- More than 350 meters,
less than 400 meters



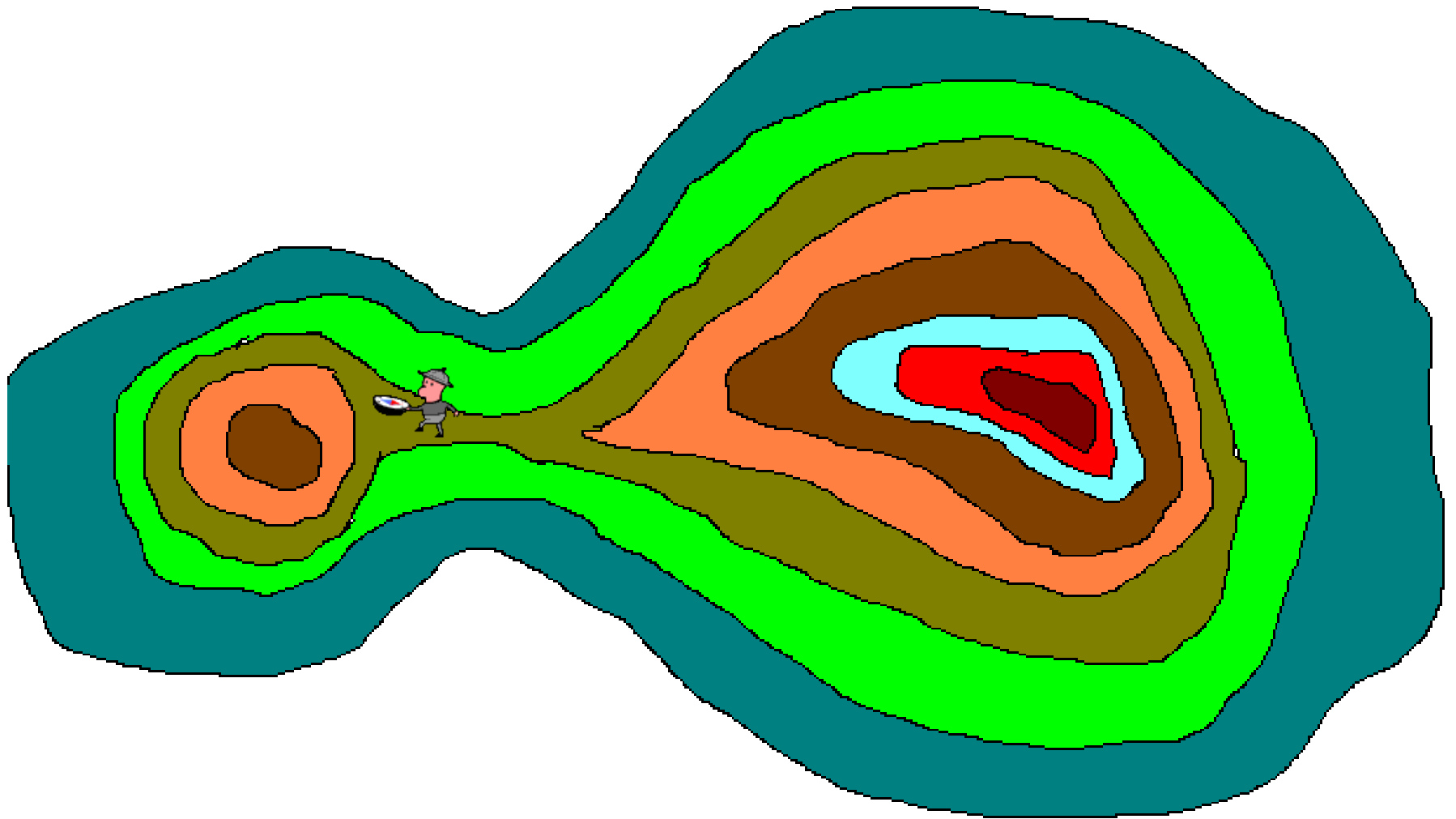
Let's head down hill.



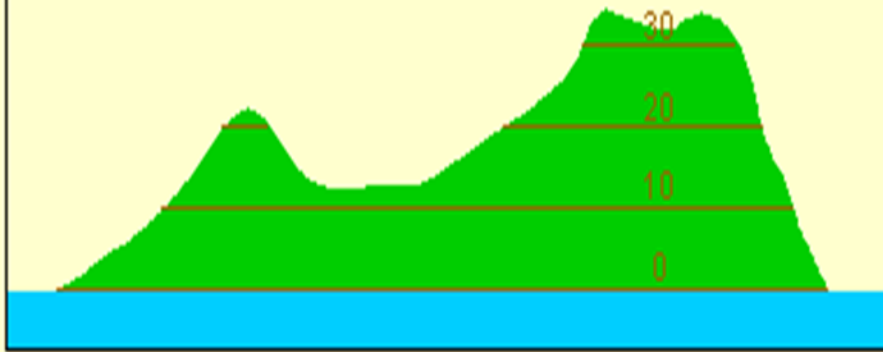
Know our elevation?



More than 100 meters,
less than 150 meters



Cross Profile
(not to scale)

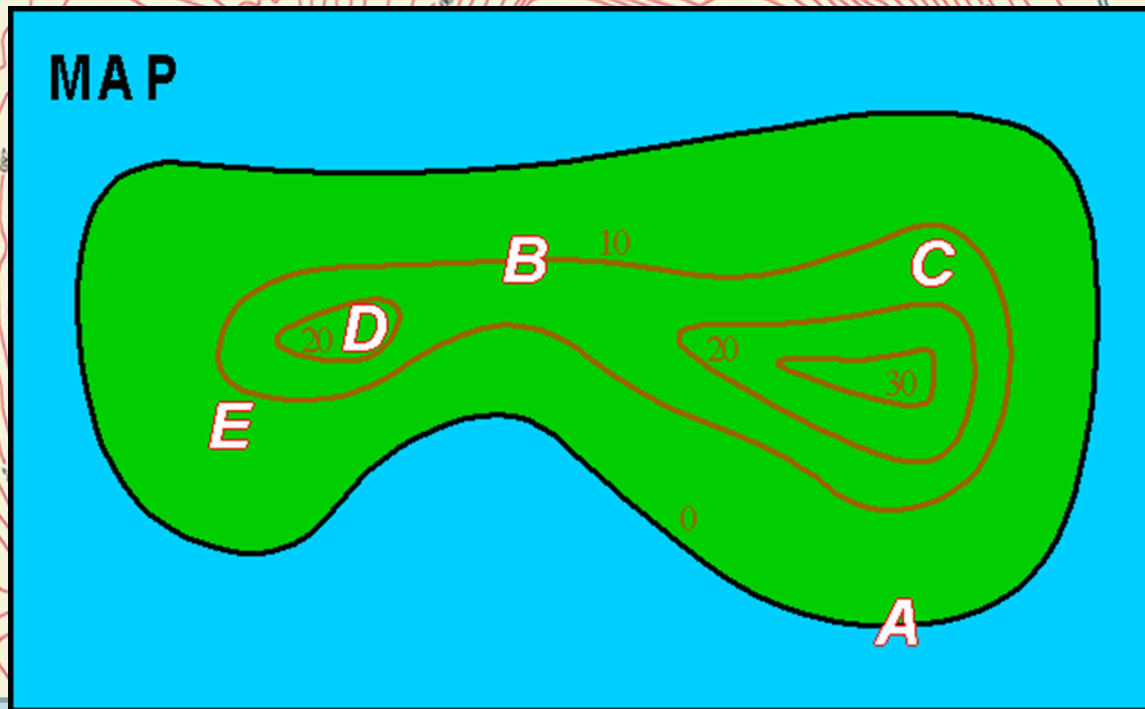


MAP



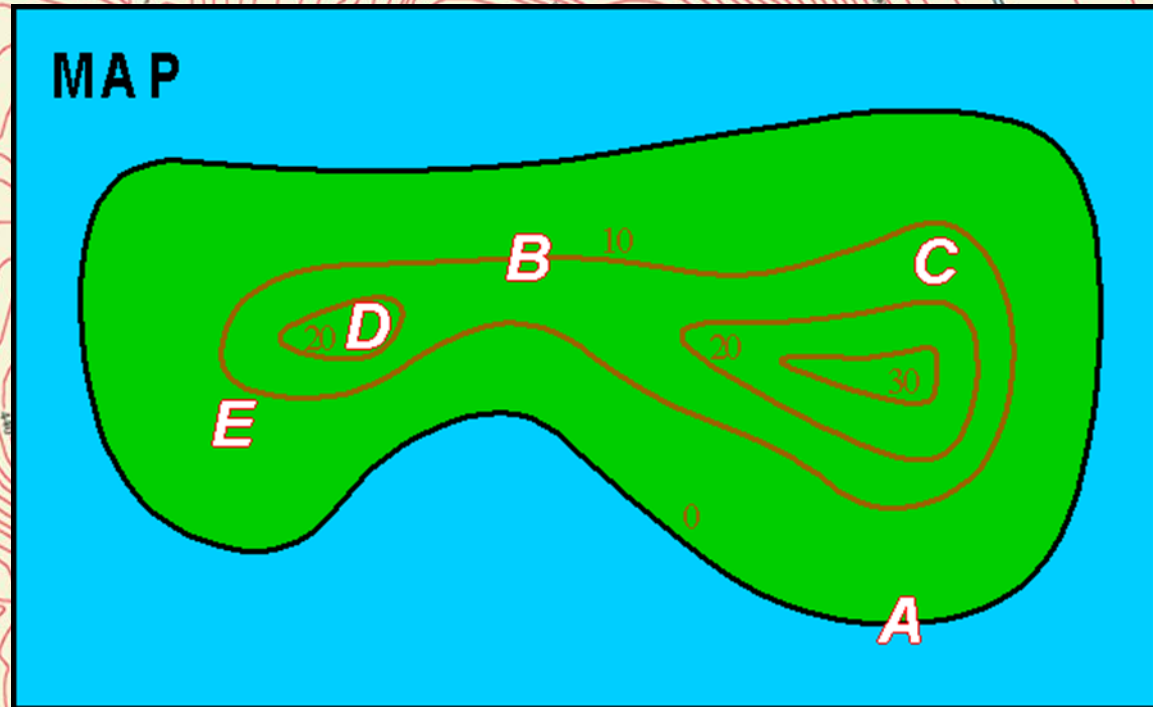
Notice the two high points on the island. What is the elevation of the two high points?

What is the elevation of Point A?



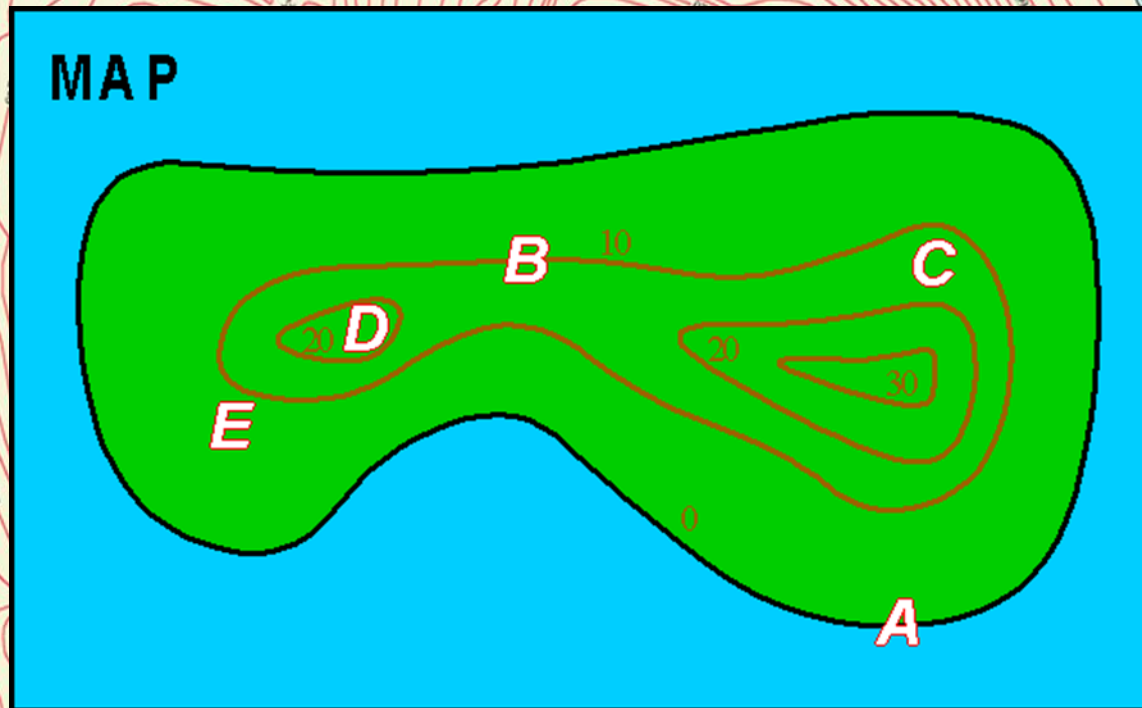
Point A sits right on the 0 ft contour line. Since all points on this line have an elevation of 0 ft, the elevation of point A is zero.

What is the elevation of Point B?



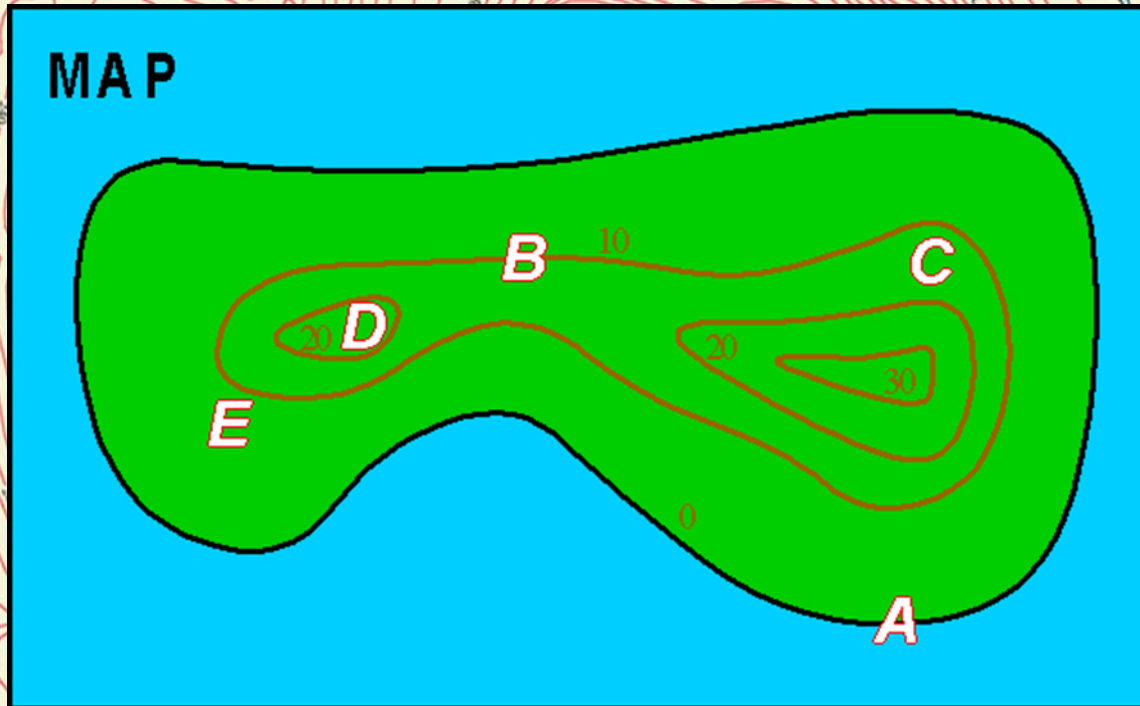
Point B sits right on the 10 ft contour line. Since all points on this line have an elevation of 10 ft, the elevation of point B is 10 ft.

What is the elevation of Point C?



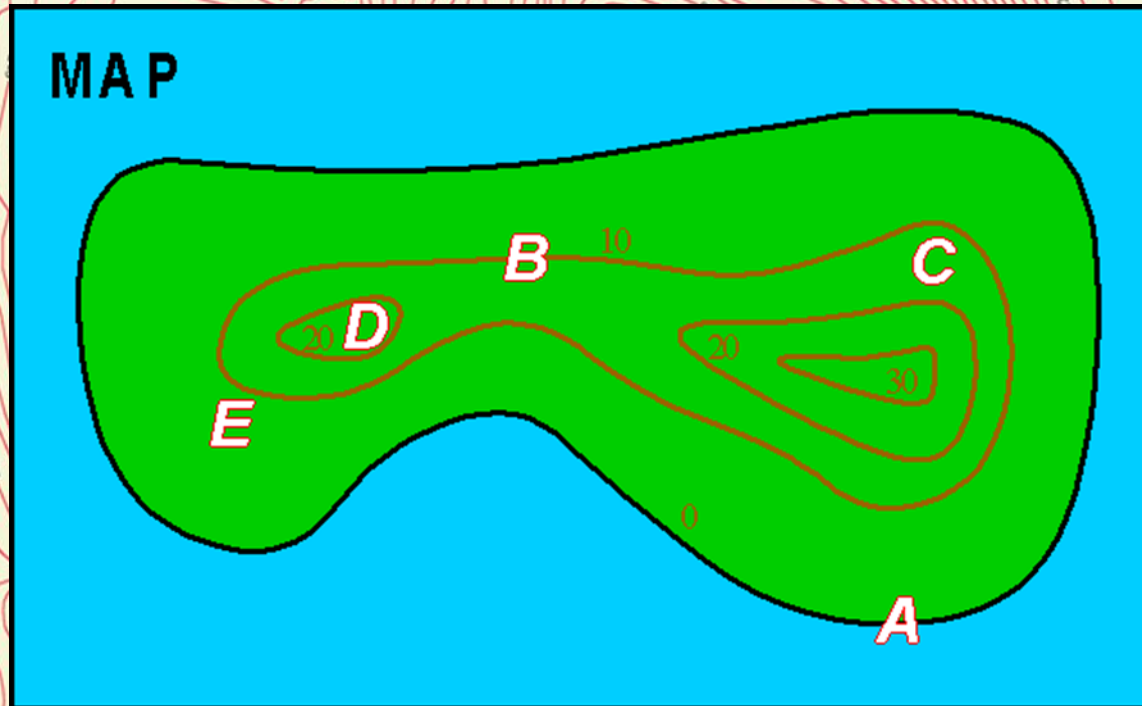
Point C does not sit directly on a contour line so we can not determine the elevation precisely. We do know that point C is between the 10ft and 20 ft contour lines so its elevation must be greater than 10 ft and less than 20 ft. Because point C is midway between these contour lines we can estimate the elevation is about 15 feet (Note this assumes that the slope is constant between the two contour lines, this may not be the case).

What is the elevation of Point D?



We are even less sure of the elevation of point D than point C. Point D is inside the 20 ft. contour line indicating its elevation is above 20 ft. Its elevation has to be less than 30 ft. because there is no 30 ft. contour line shown. But how much less? There is no way to tell. The elevation could be 21 ft, or it could be 29 ft. There is now way to tell from the map.

What is the elevation of Point E?

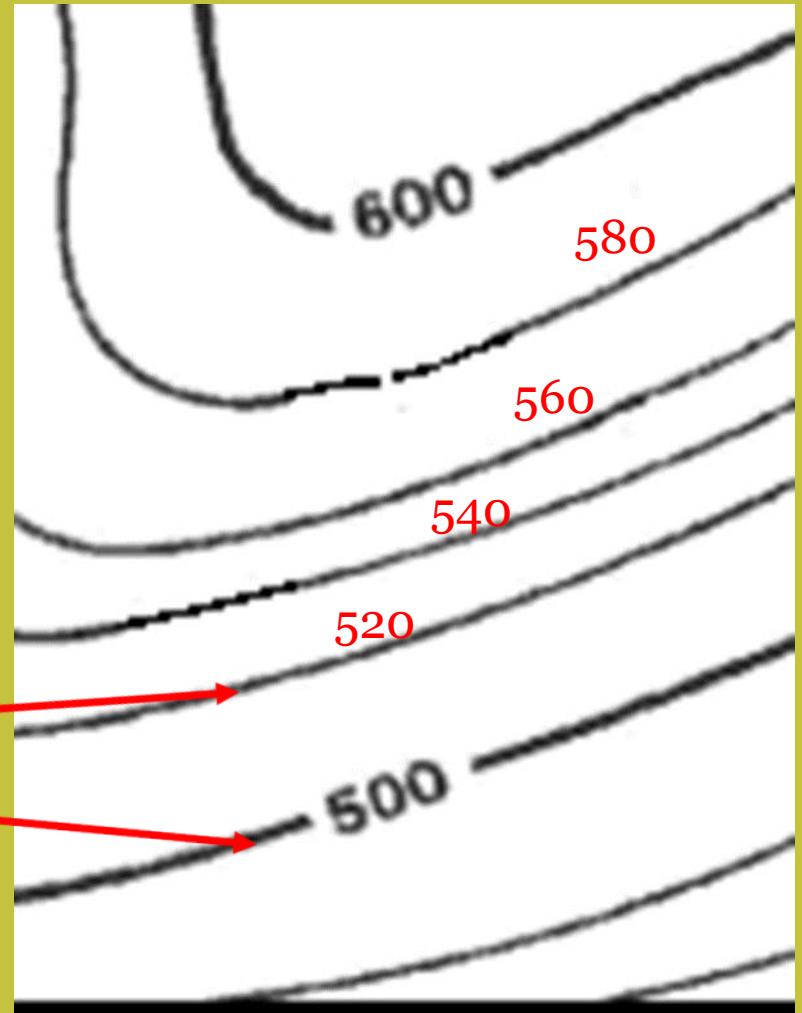


Just as with point C above, we need to estimate the elevation of point E somewhere between the 0 ft and 10 ft contour lines it lies in between. Because this point is closer to the 10 ft line than the 0 ft. line we estimate an elevation closer to 10. In this case 8 ft. seems reasonable. Again this estimation makes the assumption of a constant slope between these two contour lines.

Contour Interval –

- difference in elevation between each line. **MUST** be equal spacing.
- Remember that a contour interval is not the distance between the two lines – to get the distance you need to use the map scale

Contour interval =
20 feet



What is a profile?

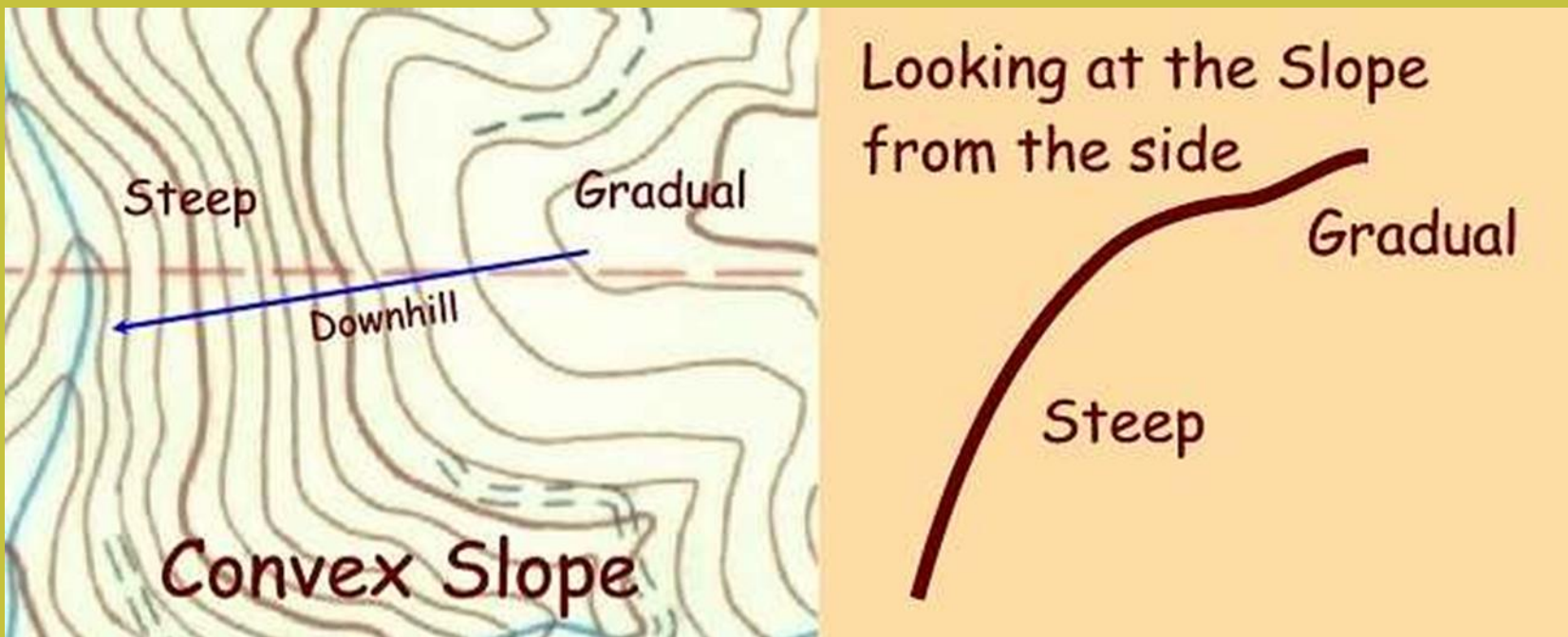
- A profile is the side view of a topographic map.
- Cross sectional view along a line drawn through a portion of a topographic map.

Other Topographic Terms

- **Map scale** – compares distances on the map with distances on earth.
- **Legend** – explains symbols used on the map.
- **Index contours** – contour lines that are labeled to help you find the contour interval.
- **Gradient** – vertical change in elevation
- **Relief** -is the difference between its high and low points.

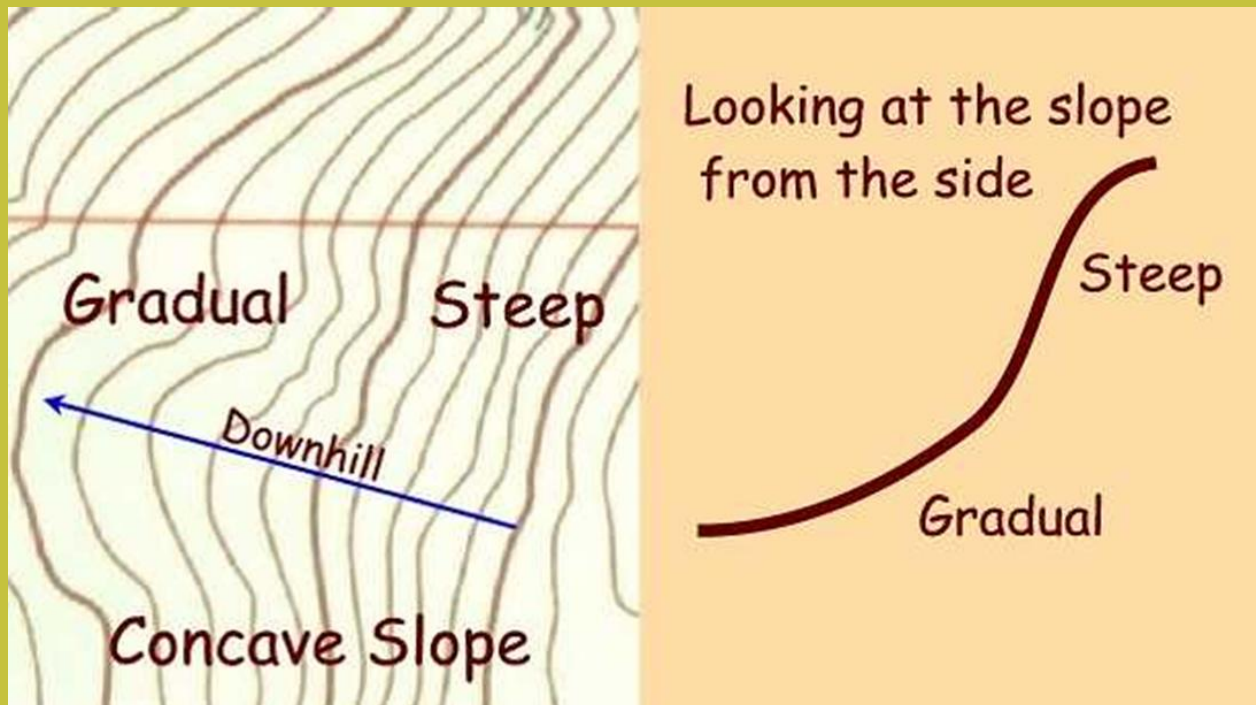
What if my contour lines are close together?

- If the contour lines are close together, then that indicates that area has a steep slope.



What if my contour lines are far apart?

- If the contour lines are far apart, then that indicates the land has a gentle slope (low slope).



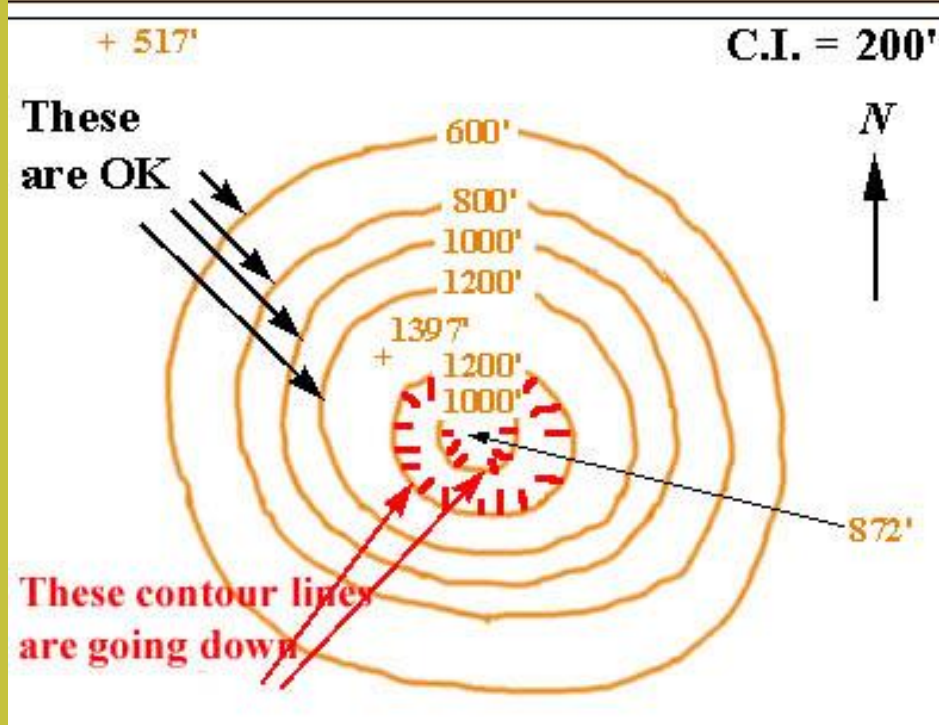
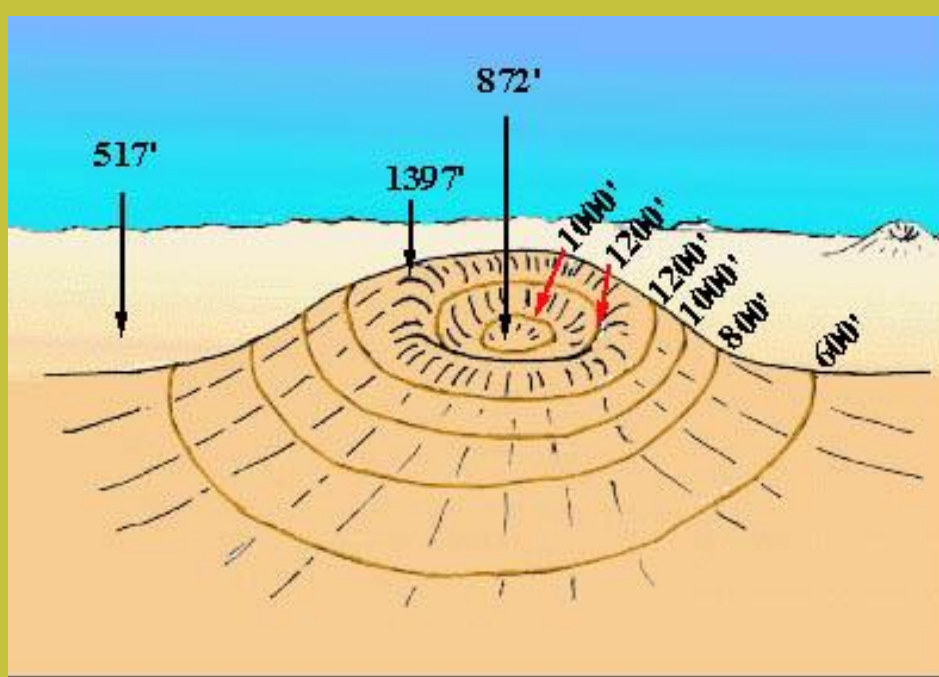
What do the dark colored contour lines mean?

- The dark colored contour lines represent every fifth “index” contour line to make it easier to read.



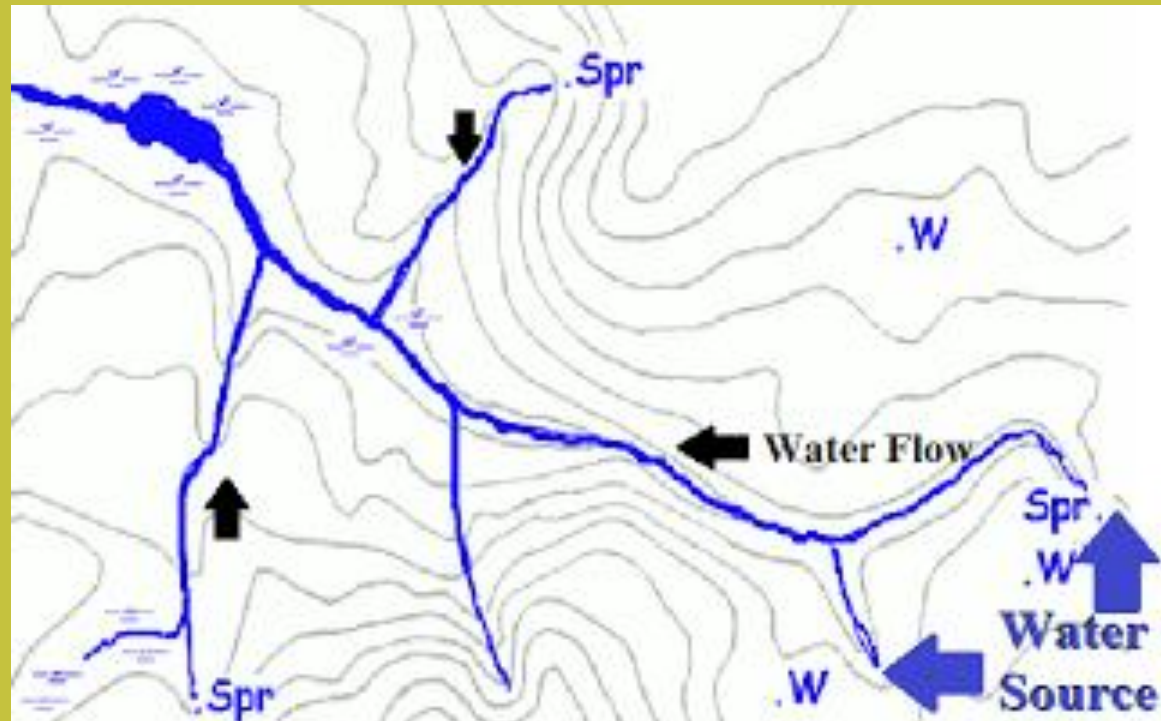
What do depressions in the map look like?

- A depression such as the inside of a dead volcano, is represented by Hachure lines.
- Hachure lines are regular contour lines with small segments sticking out from it.
- The first hachure line is at the same elevation as the contour line before it.



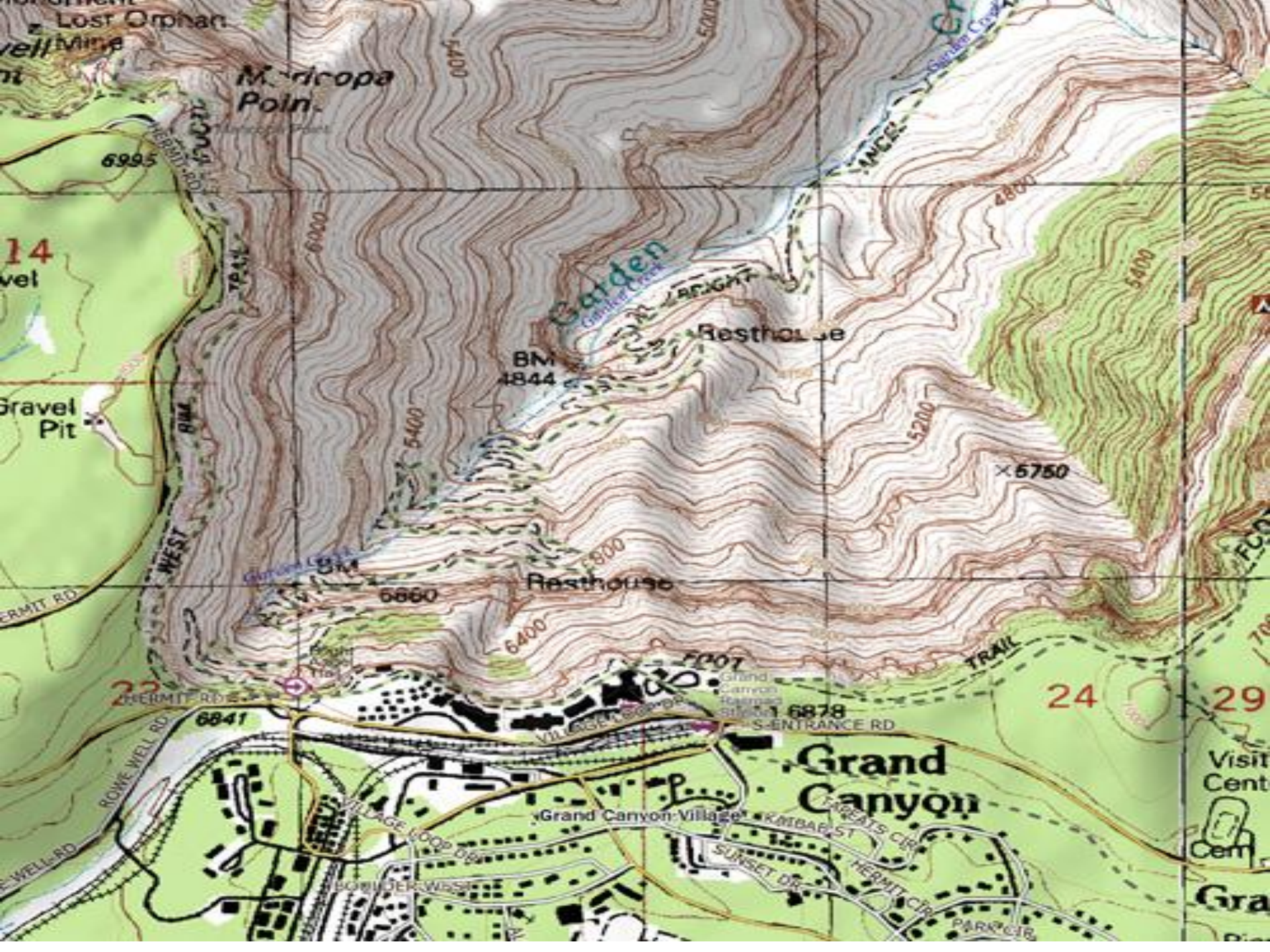
More on Contour Lines

- Contour lines form **V's** that point **upstream** when they cross a stream.
- It is important to remember that they point in the opposite direction as the flow of water



What do the colors on the topographic map represent?

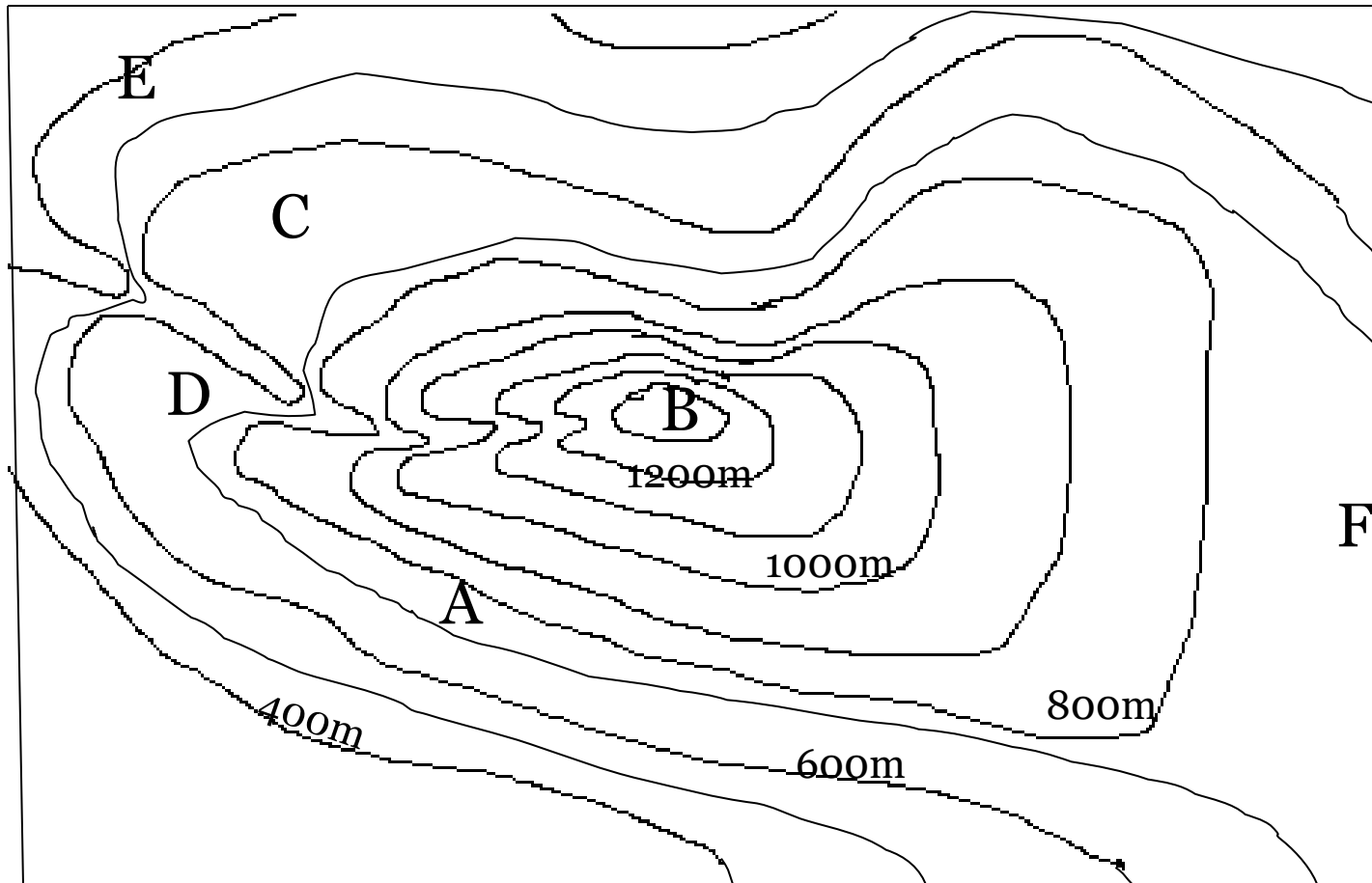
- Blue lines/shapes – represent water features, such as streams and lakes.
- Brown – contour lines
- Black – roads, buildings, railroads, other manmade objects.
- Green – Woodland areas
- Red - Highways



Now that I know what a topographic map is, how do I read it?

- First - determine the contour interval (the distance between each contour line)
- Second - determine the map scale (usually at the bottom of the map)
- Third - Identify any hills or depressions
- Fourth – Use the legend to identify man made features.

Let's see what you know.

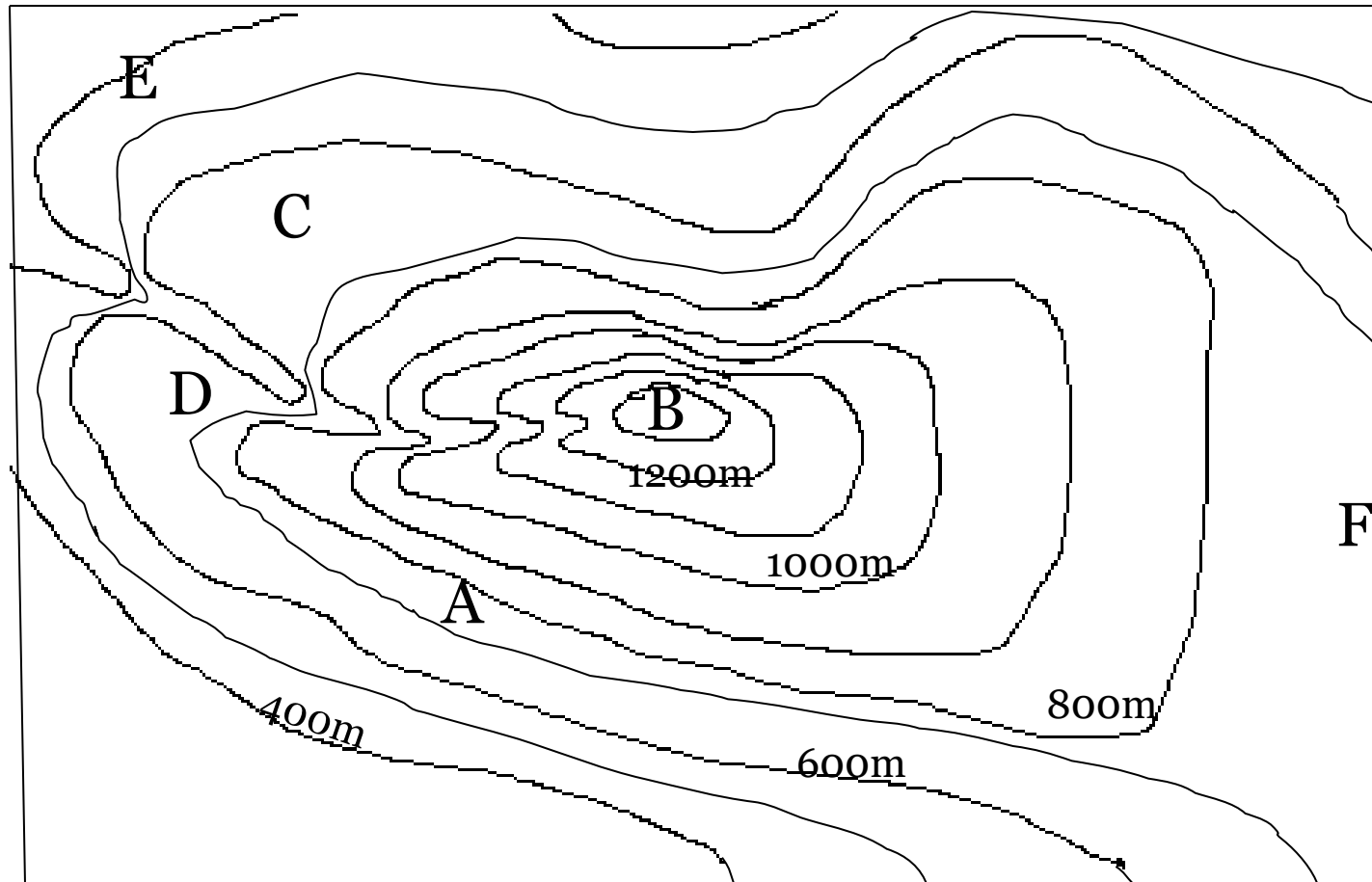


Quiz Time

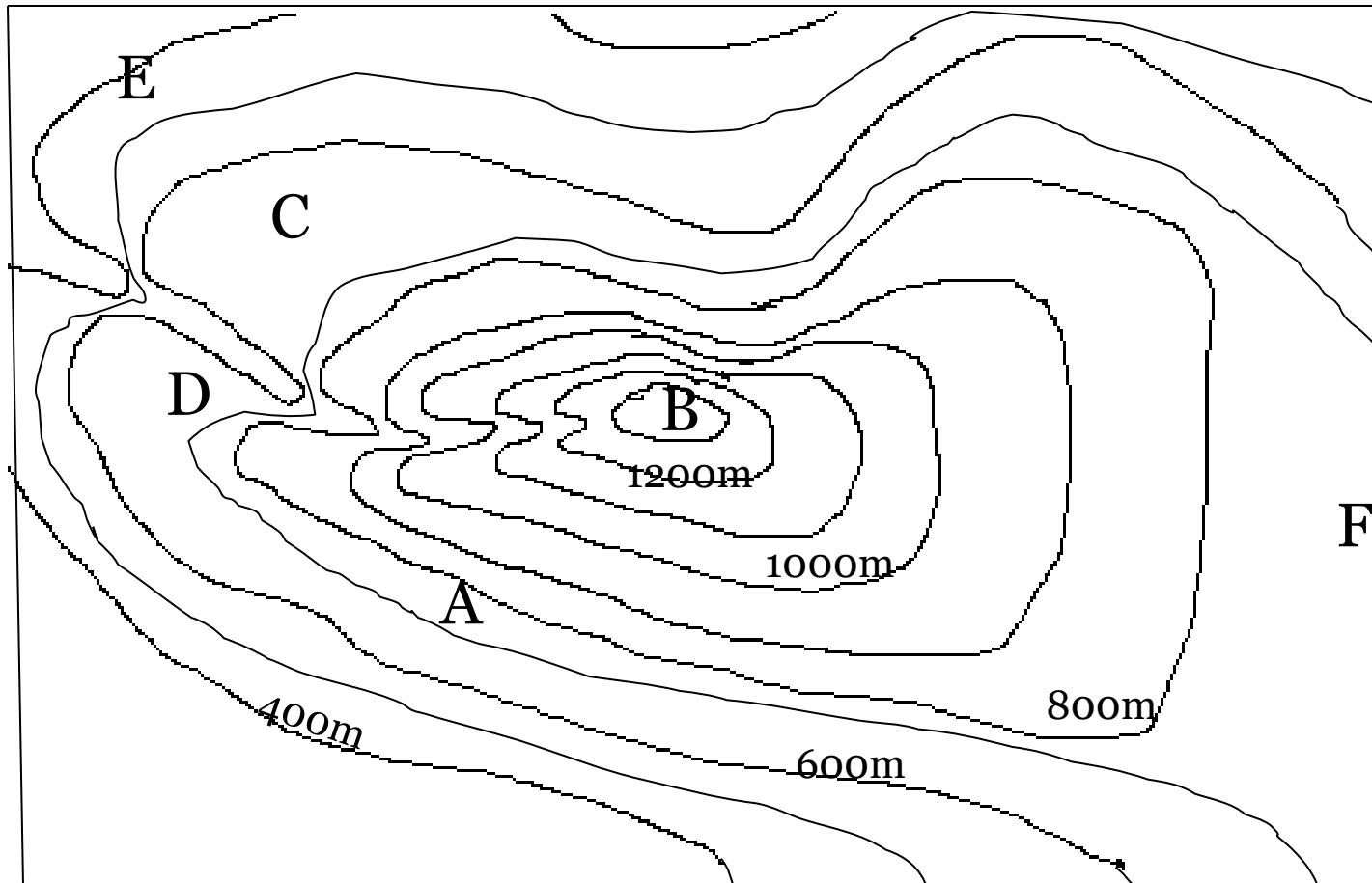
Grab a piece of paper and write your answers to the following questions.

Ready?

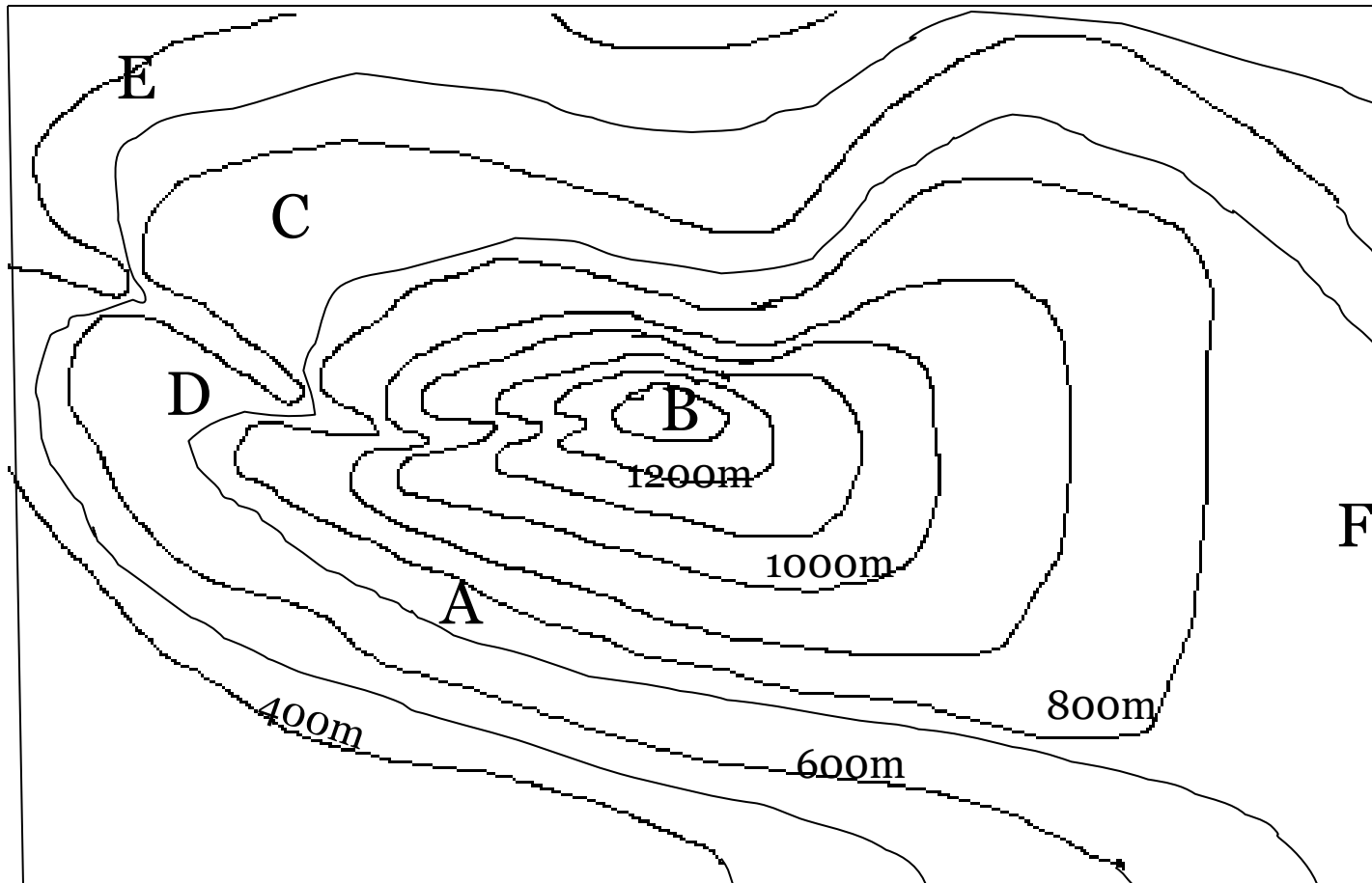
1. Could the elevation at the peak (B) be 1410 meters?



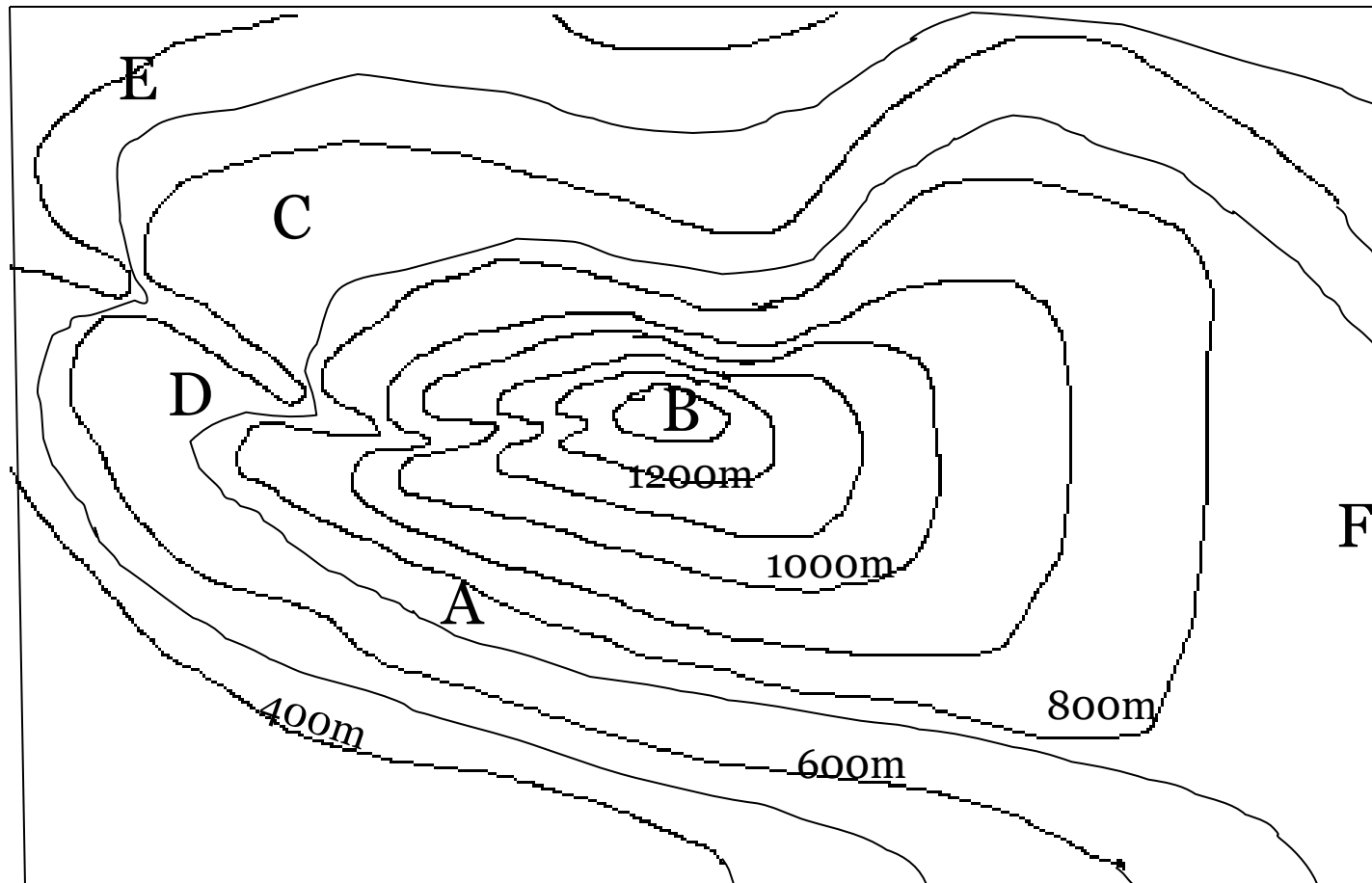
2. What is the elevation at (E)?



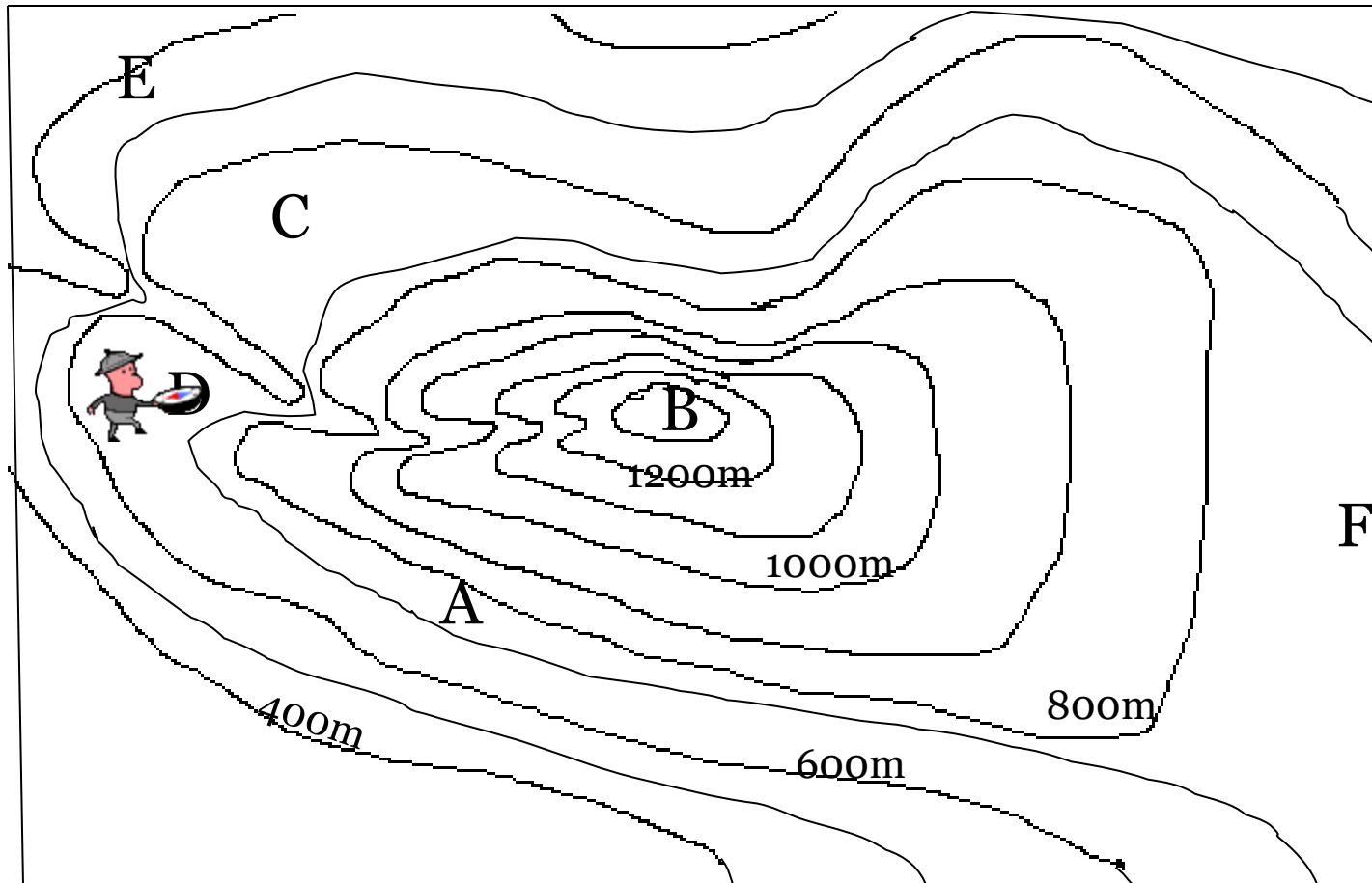
3. What is the elevation difference between (A) and (B)?



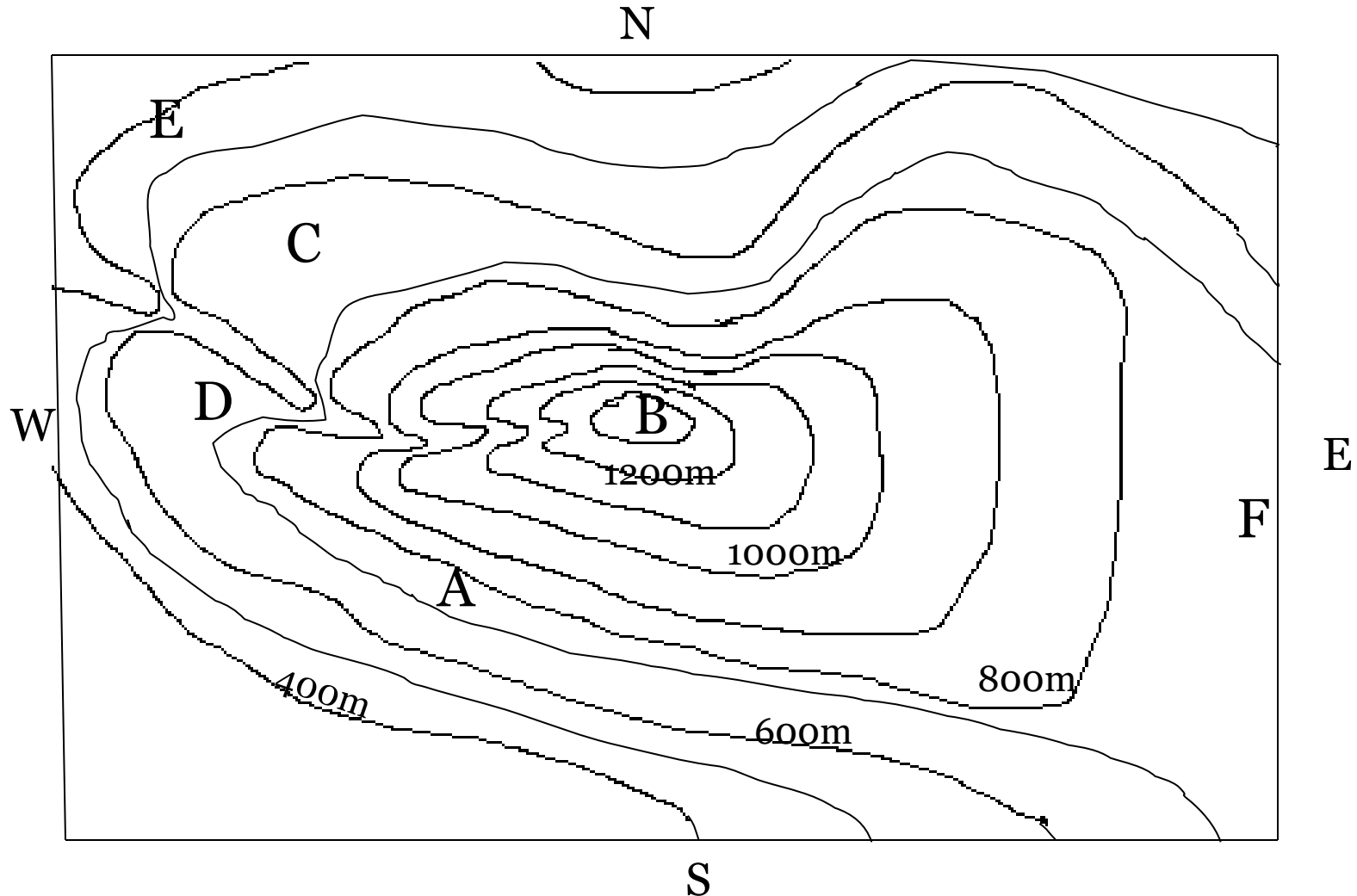
4. Could the elevation at (F) be 417 meters?



5. If you walked a straight line from (D) to (C) would you walk over a ridge or down a valley?



6. Just looking at the map, would it be easier to head down from the peak going East, or going North?



Answers!

- 1. No :The elevation must be under 1400 meters, but over 1300 meters.
- 2. about 400 meters

Answers!

- 3. (A) is probably close to the 750 meter line, (B) is above 1300 meters. The difference between the two would probably be 650 to 700 meters.

Answers!

- 4. No: It must be more than 700 meters and less than 800 meters.
- 5. Down a valley: If the contour lines point up the slope it's a valley, if they point down the slope it's a ridge.

Answers!

- 6. East: When contour lines are close together that means there is a steep slope, the further apart the lines, the more gentle the slope and therefore an easier walk! Go east!