

Road Scholar
Gopher Science Olympiad Invitational
January 6, 2018

Team #: _____

Team Name: _____

Names: _____

Score: _____

Welcome to Road Scholar! Your Science Olympiad team is planning a trip to an invitational tournament in Duluth and has decided stay an extra day to explore Lake Superior and the surrounding areas. Your task is to determine key information about the area to aid in planning.

Tools you may use:

- Non-programmable, non-graphing calculator
- Protractor
- Ruler
- One three-ring binder with USGS Map Symbol Sheet & other information in any form and from any source

Please check that you have the following maps:

1. Minnesota State Highway Map
2. Lutsen Topographic Map
3. Lutsen Road Map

Do not write on the maps – 15 points will be deducted if any markings are found after use.

Good luck!

MN State Highway map

What is the scale of this map?

Your team is starting in Minneapolis. What grid location is Minneapolis in?

What is the main interstate to drive up to Duluth?

Along this interstate, how many full rest stops will you pass?

What is the minimum number of counties your team will set foot in when travelling between Minneapolis and Duluth? You may take any route possible but must stay on roads shown on the map.

What county is Duluth located in?

What is the distance from Minneapolis to Duluth, computed via trunk highways?

What is the approximate population of Duluth?

Your team wants to stop at St. Cloud on the way to visit their famous Munsinger Gardens. How much added distance will this detour add, as the crow flies, if your team first drives to St. Cloud then to Duluth?

In addition to St. Cloud, your team wants to visit the Northwest Co. Fur Post, a State Historic Site. What major city is nearest to this site?

Another option when driving to Duluth is to take State Highway 23, marked as a scenic byway. Which city does State Highway 23 originate?

For some reason, some teammates want to drive through Wisconsin and take the minimum number of highways possible. Therefore, you should take MN State Highway 36 east to Wisconsin, followed by which Wisconsin State Highway all the way to Duluth?

After the tournament, your team wants to explore the parks in northern Minnesota. After much debate, the team decided to visit Lutsen, MN, home of the Superior National Forest and various other mountains, along the shoreline of Lake Superior.

Which state highway should you drive along from Duluth to arrive at Lutsen (P7)? How far away are the two cities in miles?

Lutsen Maps

What county is Lutsen located in?

What arc length area of latitude and longitude does this map cover?

What are the grid and magnetic declinations for this area? Include direction (clockwise/counter-clockwise)

What is the name of the quadrangle directly west of the Lutsen quadrangle?

What is the contour interval?

What coordinate system does the yellow grid and corresponding axis numbers belong to?

What coordinate system does the red grid belong to?

What lake is located at PLSS NW $\frac{1}{4}$ SE S8 T60N R3W?

What mountain is located at UTM 15T 670000m E 5280000m N?

Driving along Highway 61, how far away is Ski Hill Road from Massie Road in miles?

How long is the North Shore State Trail as shown on the map as the crow flies, in miles?

What is the maximum elevation of White Sky Rock?

What is the stream gradient of Mistletoe Creek, starting at Halls Pond and ending at Tait River, in feet per 1000 feet? (Find the total change in elevation then divide by the total distance the creek travels)

What approximate direction does Tait River flow?

Map Drawing

The square below represents one square mile of area, representing section 13 of a new map of Duluth. Please draw the features below:

1. The shoreline is a straight line connecting the midpoints on the east and south sides. Label Lake Superior on the southeast side.
2. Highway 61 is parallel to the shoreline and starts 0.1 miles west of the shoreline. Label the highway.
3. A railroad starts at the same position as highway 61 on the southern border. The first section is 0.1-mile long and north-bearing, then is parallel to Highway 61.
4. Tischer Creek starts at the northwest corner of the section and flows in a straight line at a 125° azimuth and ends at Lake Superior. Label the creek.
5. The bed of Tischer Creek starts at 1000 feet of elevation and decreases linearly until 600 feet at the Lake Superior shoreline. The contours are perpendicular to the creek. Use dashed lines and a contour interval of 100 feet, and label all contours.
6. The Scandia Cemetery is on the southern bank of the creek, located where the creek intersects with the shoreline. Mark with the appropriate symbol and include a label.
7. There are three schools in this section, mark with the appropriate symbol: SW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$, and SW $\frac{1}{4}$, SW $\frac{1}{4}$, NE $\frac{1}{4}$
8. Label the scale, section, and add a magnetic declination of 1° counterclockwise.

