

**2007 North Carolina Regional Science Olympiad
B-Division Road Scholar Event**

Participants: _____

To answer the questions, you will need:

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| ✓ A scale or ruler | ✓ A protractor |
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We have handed you:

- | | |
|-------------------|---------------------------------|
| ✓ This story exam | ✓ N.C. State Transportation Map |
| ✓ Response Sheet | ✓ Rainbow Springs Quad Map |

You may use (if you brought it):

- ✓ A transparent piece of paper or plastic to put over the maps. You may clip this to the maps, and mark on the transparency.

Please write your names on this sheet above, and your names and school on the Response Sheet. You may write on the story exam to work out the answers, but only the answers you write on the Response Sheet will count. You must decide which map to use to answer each question. There are 32 questions, and 120 total possible points. You will draw a map on the last question. If you think you are running out of time, you may want to skip to the end to complete your map.

If a question is worth more than one point, the possible points are stated. You can get partial credit for some of these questions. If you don't know the answer, you may want to skip the question, and come back to it later if you have time. When you leave, you must turn in all the maps, this exam story, and any scratch paper that you use.

Nantahala Photo Shoot

Linda, Tom, Katy, and Sid, Geomatics students, are home in Asheville, N.C., for the weekend. Sid has a serious photography hobby. He has heard the view from the top of Standing Indian Mountain in the Nantahala National Forest is spectacular, and he wants to hike there. Tom says they can hike to the mountain from the Appalachian Trail. Along the way, he will take photographs for a special album. The group unfolds their North Carolina Transportation Map to plan the trip. Katy looks at the legend to make sure the map is current.

1. What is the date of the Transportation Map?
2. What is the map scale?

Linda finds Standing Indian Mountain on the Transportation Map. It is on a county boundary.

3. What two counties are on either side of Standing Indian Mountain?
4. What access controlled road will they travel on as they leave west from Asheville? (If the road has more than one designation, use the most widely known.)

5. What multilane highway will the group take to go southwest at exit 27?
6. What multilane highway can the group take to go south near Dillsboro at exit 81?
7. What highway will they take west out of Franklin?
8. What surface does this highway have where it crosses the Appalachian Trail?
9. How many lanes does this highway have in each direction where it crosses the Appalachian Trail?
10. What kind of facility does Franklin have that they can go to if they get hurt?
11. Will this facility be open late?
12. How many miles is it from the loop around Franklin to the town of Rainbow Springs?
13. What is the population of Rainbow Springs?

The students drive to Rainbow Springs early the next morning. When they get there, Linda unrolls the Rainbow Springs quad map.

14. When was the topography shown on the map done?
15. When was the map revised?
16. What is the contour interval?

Tom says, "The scale is listed several ways on the map."

17. What is the scale ratio shown on the quad map?
18. What distance does one inch on the map represent?

Linda says, "We just passed through Winding Stair Gap. There were very steep rock faces on both sides of the road, where the road was cut through. I don't see contour lines that look like that near the road there."

19. Why are the contour lines not shown like Linda expects? Be specific. (10 points)
20. What specific thing about the way the road is drawn on the map tells you the answer to #19?

The students start to plan their hike to Standing Indian Mountain.

21. Why are the elevations shown for the top of Standing Indian Mountain different on the quad

map and on the Transportation Map?

The students decide to split into two groups. Sid and Katy will drop Linda and Tom off at Riley Cove on the main highway, turn around, and then drive on the medium duty and light duty roads to the beginning of a foot trail. When they arrive, Katy takes a reading with her hand-held GPS receiver. She reads $35^{\circ}01'37''$ N longitude and $83^{\circ}30'22''$ W longitude.

22. What ridge is approximately 0.35 kilometers to the northwest of Sid and Katy's location? (10 points)

Katy and Sid make the long hike on the trail they found. They join the Appalachian Trail at Beech Gap, on the county boundary. They turn northwest and hike up Blue Ridge.



23. What other significant geographic line are they hiking along?

They finally arrive at the top of Standing Indian Mountain. Sid takes a photo. Katy says, "The Cherokee legend is that the Great Spirit turned an actual Cherokee guard into the mountain. That guard sure has a spectacular view."

Sid says, "We are in a very important place. All the rain water that falls in the valley to the southwest of us eventually runs into the Atlantic Ocean in Georgia. All the rain water that falls to the north of this ridge line eventually runs into the Mississippi River. We can see that from here."

24. What direction does the Tallulah River generally run on the quad map? (3 points)
25. What direction does Big Indian Creek generally run? (3 points)

Katy takes another reading with her GPS receiver. She is standing where the Lookout tower is shown on the map.

26. What latitude and longitude will she read? Give your answer to the nearest second. (20 pts)

Meanwhile, Tom and Linda have hiked up the trail from Riley Cove to Chunky Gal Mountain. They stop at the trail intersection at Grassy Gap.

27. What was the highest elevation they passed on the trail to Grassy Gap? (10 pts)

Linda calls Sid on her cell phone. Since they are so high, the signal works today. Linda tells Sid where she and Tom are, and says, "There is a brown hawk circling overhead. Can you see it?" Sid looks, but does not see the hawk. He measures the azimuth on the quad map from Standing Indian Mountain to Grassy Gap.

28. What is the azimuth Sid measures? Give your answer to the nearest degree. (10 points)

Sid also wants to test his scale.

29. What is the distance from the Lookout tower location on the map to Benchmark K 44? Give your answer to the nearest 100 feet. (5 points)

Katy looks in the direction Sid has measured from the quad map. No trees are in the way around her. She has binoculars powerful enough to see that far. Sid says, "There may be a mountain between us that may block the view."

30. The end of which mountain is between the two groups? (3 points)

31. If the hawk is flying 1000 feet above the ground at Grassy Gap, and the trees are no more than 150' tall in the direction she's looking, should Katy be able to see the hawk? Explain your reasoning in detail. (10 points)

The students decide to head back while they have plenty of time before it gets dark. As the group got back together, they decide to draw their own map of features on the quad map.

32. Turn-over the answer sheet and draw a 10 cm square. Label the square outside of the box 'Kitchens Knob'. Design a map of that area in the square you have drawn. (15 points)

When they returned to Asheville, they put the photos, and their map, into an album. They remembered their great day.

The End.

This exam was written by the North Carolina Society of Surveyors Education Foundation. Visit our website at ncsseducationfoundation.com for information about a career in surveying or geomatics, and for college scholarship information.

