

Student signatures: _____

Team Number _____

_____ Team Name _____

*National Science Olympiad
Road Scholar National Competition
George Washington University
May 31st, 2008*

To the Student: Welcome to Road Scholar!

You will need pens, pencils, ruler, protractor, and calculator.
You may use any printed resources you brought with you.
You may not use a computer.

Your names, team name, and team number must be written both on this booklet and the answer sheets.

You may write in this booklet for scrap, but your final answers must be written on the answer sheets provided. All questions and answer sheets must be attached and in order.

Your answers must be complete – measurements must have units; town names must include state, province, or other appropriate identification.

If you are not certain as to what you should be doing, or if a question does not make sense to you, ask the event supervisor what to do.

Make sure you read the story line in italics. Some of the questions will not make sense without the story, so they will be harder to do.

Cautions: Avoid penalty points or disqualification!!!

Make sure you do not make any marks on any maps provided to you!

Make sure you start working only when told to do so, and stop exactly when told to do so by the event supervisor.

Good luck!

How The Grinch Aced Road Scholar

*It's been twenty four years since a fellow named Vern
Was thinking of maps -- now, how would those kids learn?
So he thought, and he thought, then he had an idea!
I know! He decided -- it's perfectly clear!*

*I'll make up a contest- how great! It's so thrilling!
I bet lots of kids would be perfectly willing
To have their brains twist up -- and knot up- - and scramble --
By stories with problems for folks as they ramble
Through maps of all kinds -- why, I'd give them top billing!*

*Road folks have been Buffy, and George, and— yup! Hillary
But I think it's 'bout time for a new one to pillory
So now we've a guy that you just want to pinch
You want to know why? THAT'S BECAUSE HE'S A GRINCH!!*

*Now Grinches are not all as bad as you'd think
And this one might help you as quick as a wink!
Because this Grinch --he's named Greg-- is really quite needin'
Assistance— from someone with answers to feed him.*

*See, he's searching for gold in the hills way up North,
But he's happy to share if your answers come forth.
So let's take out some maps, now, and let's see what you've got
Just be ready to tell him tell how, when, where, and what!*

At your station, you must have 5 maps:

1. AAA Road Map Louisiana-Mississippi
(This AAA map has blue latitude and longitude markings in the margins)
2. Electronic www.mapquest.com map, Downtown New Orleans (in question booklet)
3. USGS Picayune Quadrangle Mississippi-Louisiana
4. USGS St Paul Park Quadrangle Minnesota
5. USGS Kellogg West Quadrangle Idaho

*Now, Ginches are smart, they're quite like you and me.
When it's cold out, they sometimes just get up and flee
To a sunny, warm place --perhaps Mississippi?*

***** Use the AAA Mississippi Map*******

1. The Mississippi River has always formed most of the Western border of the State of Mississippi. However, there are several pockets of land belonging to the State of Mississippi on the Louisiana side of the River. Using your knowledge of rivers and the information on the AAA map, what is the most likely explanation for these pockets of land on the other side of the River?

2. Along the Gulf coast, US 90 runs east-west. Why is it not possible to travel the entire coast of Mississippi on US 90? Be specific.

*Now a Grinch is not random, he likes law and order
So Greg looks for space in a town near the border.
He'd like to explore like a young Daniel Boone
But first he'll sleep over in old Picayune.*

3. What are the AAA map grid references for Picayune, MS?

4. Greg has his trusty dog Max with him and wants to see if that is OK with any hotels. How can Greg tell that the AAA Tourbook will have information about hotel rooms in Picayune, MS?

Greg gets tired and falls asleep. He dreams Grinchy dreams.

*What a great night for sleeping, and morning for waking!
Why, they even left maps out—all mine for the taking!
“Now if you could direct me”, says Gregory Grinch,
“This Southern vacation would just be a cinch!”*

Greg likes Picayune and wants to come back later. But after a restful night's sleep in an AAA rated motel, Greg and Max get in the Grinchmobile and head over to I-59 to explore the rest of the State of Mississippi. Greg drives. They get on I-59 Northbound, and exit at interchange 41. They drive East on MS Route 13.

5. As he rides East along MS 13, Max notices lots of trees along both sides of the road, and not much commercial development. What protected area of land are they in?

Greg intersects US Route 49 just South of Maxie, MS (AAA N-16). He turns Northward on US 49. Max immediately notices that the road changes.

6. How does the road classification change when going from MS 13 to US 49?
(Express your answer as: MS 13 is ___ and US 49 is ____)

Greg drives Northward on US 49. He passes under I- 59 and continues on to Collins, MS. He always heard that his Aunt Orpha lived here, and maybe he can find the old family farm.

7. What is the road distance along US 49 from its intersection with I-59 to Collins, MS?
(Express your answer to the nearest whole mile)

*“In Collins, I think, I might find some new facts
About land deals in parcels, or maybe in tracts
Did Aunt Orpha buy out all the farms in this county?
Did she sell them for profit and live off the bounty?”*

8. How could Greg tell there is a courthouse with records of property sales and deeds in Collins, MS?

Greg has lunch at a restaurant on the courthouse square. There was too much salt on the fries, and after a little while he starts thinking about getting a glass of water. He continues North on US 49 to its intersection with I-20 near Jackson, MS.

9. What does the “star in a circle” symbol for Jackson, MS mean?

Greg is really getting thirsty, and he’s headed for the Mississippi River.

*Now I don’t want to be just an old fuddy-duddy
But they tell me the River is called the Big Muddy
If I drink it, does that mean my insides get cruddy?
Do my guts get all dirty, for meters and inches?
Will I get really grumpy, like the rest of the Grinches?*

10. What is the drinking water source for Jackson, MS?

Greg has some nice Jackson tap water and he’s feeling happy—a little less Grinchy. Max wants to fly down to Gulfport, MS to visit his puppy – in - law. Greg makes a quick side trip to drop Max off at the airport in Jackson.

11. If Max flies from Jackson to Gulfport, what airport codes will show on his luggage tags?

Greg continues West on I-20 and reaches Vicksburg, MS. He looks out at the mighty Mississippi River.

*There’s real history here, said the Grinch with some smiles
Vicksburgers look down on the River for miles!
There was Grant (but not Lee) right on this very spot!
Back in Civil War days— Dude, this place was real hot!
“Why not stop and learn more?” Asks the Grinch with a grin
“Let’s find parking spots and just turn the car in!”*

12. Where might you and the Greg stop to learn more about the military history of Vicksburg?

13. What is the latitude of Vicksburg, MS? (Express your answer in decimal degrees to the nearest tenth of a degree)

*The War Between States is long gone - - time does flee!
And there’s Riverfront places I’m longing to see
So a steamboat’s just perfect for Ginches like me
Why, I’ve heard they just rebuilt the old “Robert E. Lee”!*

******* Map Change*** Use AAA Louisiana Road Map*****

14. As Greg continues downriver, he sees the Three Rivers Wildlife Management Area in Louisiana at I-44. Name the three Rivers that flow through this area.

Greg notices that there are few bridges. When they reach St. Francisville, LA (J-46) they see a ferry crossing the River. Greg can see a family of five Grinches walking onto the ferry.

15. How much will it cost the family of Grinches to cross the Mississippi River Southbound on the Ferry at St. Francisville, LA?

Sailing down the Mississippi sure is a treat, just as it must have been when the original Robert E. Lee got famous (and won a lot of bets) by steaming from New Orleans to Vicksburg in record time. But things move faster now, and the roads are not as twisted as the River.

16. According to the AAA, how long should it take a Grinch to drive from Vicksburg, MS to New Orleans, LA by the most direct route? (Answer as: __hours, __ minutes)

17. According to the AAA, what would be the Grinch's average speed, not counting stops?

*******Map Change***** Use AAA New Orleans and Vicinity Insert Map*****

Greg's riverboat journey ends at New Orleans, LA. As the Robert E. Lee steams into the City, Eastbound on this section of the River, it passes under the Huey Long Bridge, and docks at the Toulouse Street Wharf (not shown on this map) near the World Trade Center.

18. How long is the Huey Long Bridge? (Measure only the portion directly over the River and express your answer in meters)

19. Greg is so thankful for your help in using the AAA map that he decides to get you a new one. Would you tell him the location of the AAA office in New Orleans? (Name the two roadways at the closest intersection)

Greg remembers the disastrous flooding in New Orleans following Hurricane Katrina. He drives over to the Inner Harbor Navigation Canal connecting the Mississippi River and Lake Pontchartrain. The Eastern wall of this canal failed at Florida Avenue the day after Katrina.

20. What neighborhood or parish (county) flooded as a result of this failure?

******* Map Change*** Use Electronic Map from www.mapquest.com *****

(Note—Questions # 21 and 22 are based on this map, and are printed on the map sheet. This may be either the next page in the question booklet or a separate sheet)

*****Electronic Map (Downloaded from www.mapquest.com.) *****

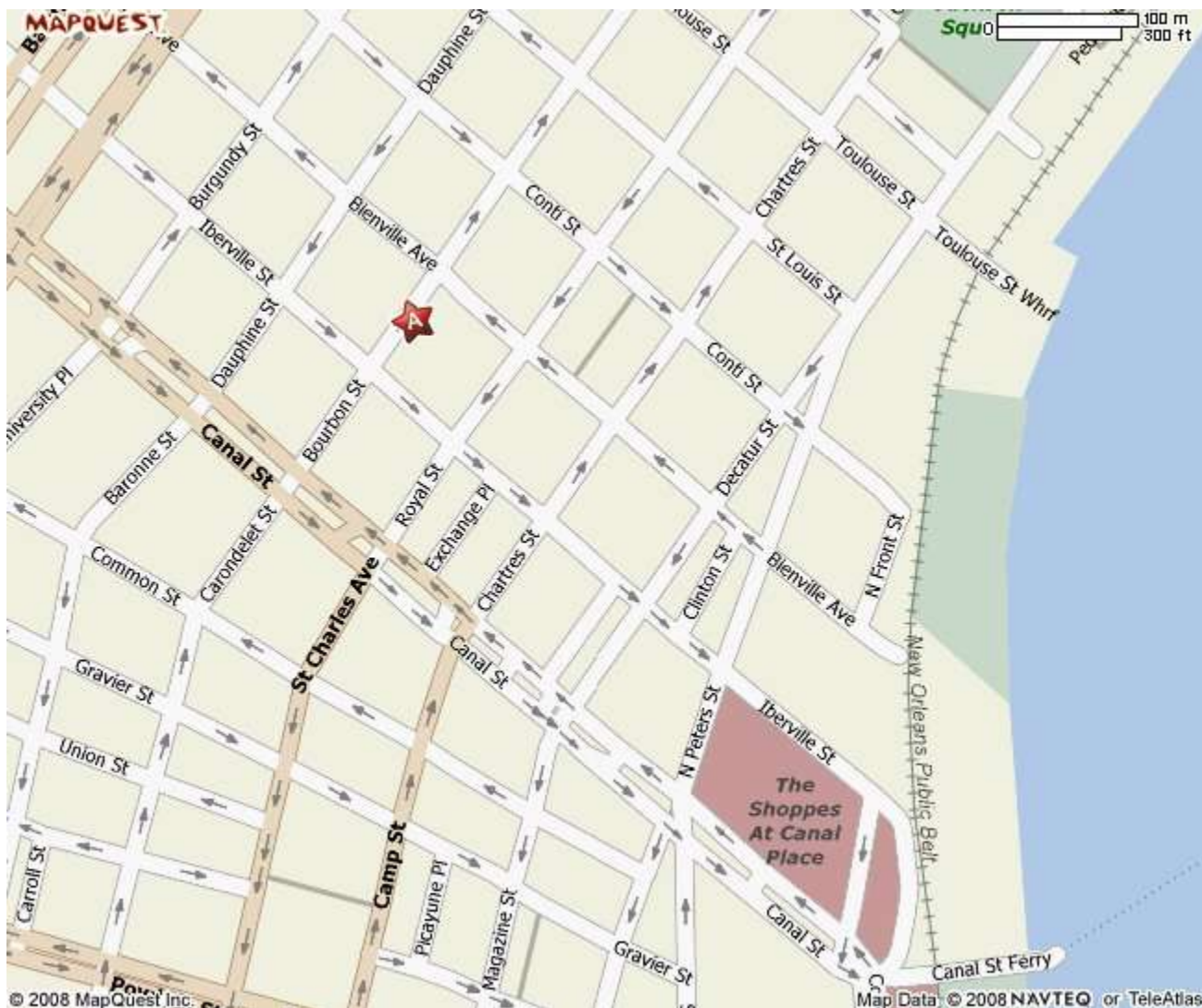
On this map, locate:

Toulouse St. Wharf on the Mississippi River

Fat Dave's Dixieland Heaven Club at 250 Bourbon Street (Marked "A" in a star)

21. Max the dog drives to the Toulouse St. Wharf and picks up Greg in a car. They would like to hear some of that famous New Orleans jazz, so you must give Max legal driving directions to Fat Dave's Dixieland Heaven Club on Bourbon St. Make sure you identify all streets and turns. Although there are a number of possible routes, you must select the route with the least number of turns. Max has a hard time turning the steering wheel with his paws.

22. If every intersection has a traffic light, how many lights would Max have to pass on this trip?



****** Map Change**** Use USGS Picayune, MS-LA Quadrangle Map******

*Gregory Grinch and his trusty dog Max
Are proud to work hard—they just never relax!
So they fly to Ol' Miss, and to shorten the trip,
They land at Picayne's Municipal Airstrip.
Now Greg's all awake and he's rarin' to go
So the Grinch from his pocket takes out his topo .*

23. What is the basic contour interval on this map?

24. This topographic map includes parts of Mississippi and, in the Southwest corner, Louisiana. In what USGS Map Sector is the Louisiana portion located?

25. The Municipal Airport is located just West of the developed area of Picayune. Of what material is the surface of its runway composed?

26. If the pilot of Gregory's fixed wing aircraft is making the most direct approach from Louisiana, what azimuth should she use on her final approach to the runway?

Greg thinks it might have been better to come to Picayune by using a helicopter with floats and landing on the small pond on airport grounds.

*"We could look out the window—you, know, for the viewering?
But it's just that this water is used for their sewerage!
Now I never complain but that fluid looks heavy
So I think we should really just check out this levee!"*

27. What is the total length of the levee surrounding the Sewage Treatment Pond at the Municipal Airport? (Express your answer in meters)

What Max likes most about Picayune is how nice all the people are!

*All the folks around here have that real "down home" charm
(It's an old Southern custom from back on the farm)*

28. What type of farming activity is shown in Ozona, MS in Section 24 (Map Sector NE3)?

*I think if I stay here I'll just get real old
But never, oh never will I ever find gold!
I just have to go forth and not stay here and whine
Guess I'll fly to the North and just find me a mine!*

***** Map Change*** Use USGS St. Paul Park, MN Quadrangle Map*****

*Now I'm way, way up North and I'm still on the River
But the water's so cold that it just makes me shiver!
It was warm when we steamed so far way down South—
At New Orleans, way down near the Big Muddy's mouth!*

29. At its closest point in the map area, how far is the Mississippi River from its mouth at the Gulf of Mexico? (Express your answer to the nearest whole mile)

30. In Louisiana and Mississippi the River was pretty wide. How wide is the River in this area? In Map Sector S8, locate PLSS Sections 33 and 34 of Town 27 North. Using the red North-South boundary line between them as a guide, measure the width of the Mississippi River. (Express your answer in meters.)

31. The River is bordered by bluffs on both the North and South shores. Working along the same North-South boundary line as in the previous question, locate the spot elevations 772 ft (atop north bluff) and 859 ft (atop South bluff). What is the average height of both bluffs above the water level on the River surface? (Express in feet)

32. The Mississippi flows Eastward through the map area. What is the difference in water surface elevation between the Western neat line (map border) and the Eastern neat line?

*Now, a Grinch may explore and he'll search for free gold
But regular folks never find it, I'm told
Instead they just work at their jobs and they toil
To put gas in their cars, and to pay for the oil.*

33. What industry is being actively carried on in Sector SW7 on Lower Grey Cloud Island ?

34. In Map Sector C5, in the Southeast quarter of Section 20, Greg wants you to give him the low-down on a depression shown on the map. What is the lowest possible elevation at the bottom of the depression?

35. Lots of industrious folks get their building supplies at the Home Depot in Cottage Grove, MN, just off the exit from US 10/61. The long rectangular Home Depot building is shown in purple. Between what years was the Home Depot constructed?

36. Home Depot has lots of stuff because the building is pretty big. How long is the building? (Express your answer in feet)

37. Max is complaining that his GPS unit is so old that it uses Public Land Survey System instead of satellites. When he is at Home Depot, how does his unit describe his location? (Answer as ____, ____, Section ____, Town ____, Range ____)

Greg buys some mining supplies at Home Depot. US 10/61 is so straight that his chartered plane lands on the roadway, then flies off to Kellogg, Idaho.

***** Map change*** Use USGS Kellogg West, Idaho Quadrangle Map*****

Greg and Max fly into Shoshone County Airport in Map Sector 5. Max is looking at the topo map and checking his compass.

38. What is the magnetic declination at the airport? (Give amount and direction)

39. The Kellogg West, ID topo map area is further North than the St. Paul Park, MN map area. Using Northern corner marks on both maps as reference points, how many degrees, minutes, and seconds of latitude further north is it? (No N or S needed for this question)

*My path to the gold won't be straight as an arrow
But Map Dude! How come my map is so narrow?*

40. Why is the map area for Kellogg West, ID narrower than Picayune, MS topographic map, even though they both cover 7.5 minutes of latitude and longitude?

41. Although the Northern half of the map area lies within the Coeur D'Alene National Forest, the grey shading indicates private land. How many square miles of private land are shown in the Forest? (Answer to the nearest whole square mile).

*Now Greg can start searching for gold –he'll go panning
And you'll earn half the find (so he says he is planning)
Of riches he gets there, if help you provide
So answer quite quickly, then help him divide!*

Gregory finds no gold while panning in the South Fork of the Coeur D'Alene River at the Airport. He stops for coffee in Kellogg, ID, and meets some local folks. They tell him that the lead smelter in Government Gulch (Map Sector S8), produced large amounts of lead but also large amounts of toxic fumes and mine tailings. Pollution in the Coeur D'Alene River extends far downstream.

42. How does the location of the mine tailings show potential for water pollution?

43. What evidence on the map shows harmful effects of fumes from the smelter?

The Government Gulch area and the South Branch of the Coeur D'Alene River are now EPA Superfund Pollution Cleanup Sites. With mining jobs gone, the town is opening ski lifts and promoting tourism. Greg thinks:

*“Well, I came to get rich, really right from the start
But I think that these problems might just change my heart”*

Gregory knows how important the stream flow in the River is, so he gives up his search for gold and decides to center his attention on the water gaging station in Kellogg, just East of the old Settling Ponds.

44. If a sudden but very localized thunderstorm dropped 4 inches of rain only on the Shoshone County Airport, how would the stream gage station at Kellogg respond? (Express your answer as: the gage will ___ because ____)
45. What is the latitude at the gaging station? (Express in degrees, minutes, seconds)
46. What is the longitude at the gaging station? (Express in degrees, minutes, seconds)
47. What is the UTM easting for gaging station?
48. About 500 meters South of the gaging station, the town's new ski lift starts a long trip into the mountains. Measuring from its start in Kellogg, along what old fashioned compass bearing is the ski lift built?

Questions 49 and 50: Profile Problem (On Answer Sheet)

On your answer sheet, draw a profile along the route of the ski lift.

*Well, old Gregory Grinchy just never got rich 'n
But he worked hard to clean up the town—glad to pitch in!
And he said as he left with his new dog named Sunny
“Yes, I got really rich, and I'm not being funny,
When I worked to help out --- that's much sweeter than money!
Good deeds, I am sure, do great good for your heart
And you also should do them --- at least make a start!”*

Questions 51 to 54: Map Drawing Problem (On Answer Sheet)

*Since I've helped out those nice folks, and you have helped me,
Why not stop at my home for some cookies and tea?
For despite what your read about grumpy old Grinches
We'd happily sing like canaries, or finches!
I know you can find me, you've shown me that mapping
Is something that you could do even while napping!*

***Greg says “Check your papers- make sure you show units!!
And get things in order ‘cause -- well-- pretty soon its
The end of the contest—you'll see no more rhymes!
But thanks and I wish you the best of all times!”***