

SI Geology - Full Discipline Demo

Topographic Maps

Final Report - Answer Guide

Institution	Science Interactive University
Session	SI Geology - Full Discipline Demo
Course	SI Geology - Full Discipline Demo
Instructor	Sales SI Demo

Test Your Knowledge

Classify the following statements as true or false.

⌘ A topographic profile provides an aerial view of quadrangle maps.

⌘ Contour lines are lines of equal elevation on a map.

⌘ Fractional scales compare like units of measurement on a map.

⌘ Index contour lines occur between intermediate contour lines.

⌘ Lines of latitude are also referred to as meridians.

⌘
Rivers and ridges can be identified on a topographic map by a "V" pattern in contour lines.

⌘
The difference between grid north and magnetic north pole is referred to as declination.

⌘ True north is the point where 90° north latitude intersects all lines of longitude.

True

False

1

2

Correct answers:

1

True north is the point where 90° north latitude intersects all lines of longitude.

Rivers and ridges can be identified on a topographic map by a "V" pattern in contour lines.

Fractional scales compare like units of measurement on a map.

Contour lines are lines of equal elevation on a map.

2

The difference between grid north and magnetic north pole is referred to as declination.

Lines of latitude are also referred to as meridians.

A topographic profile provides an aerial view of quadrangle maps.

Index contour lines occur between intermediate contour lines.

Exploration

Lines of latitude measure north-south position between the poles.

- ☒ True ✓
- ☐ False

_____ scales compare different units of measurement on a topographic map.

- ☐ Fractional
- ☐ Latitude
- ☒ Bar ✓
- ☐ Topographic

_____ is continually moving due to changes in currents in the core, and is not always located in the same place.

- ☐ True north
- ☒ The magnetic north pole ✓
- ☐ Grid north

The steepness of a slope is called its _____.

- ☒ gradient ✓
 - ☐ relief
 - ☐ vertical
 - ☐ contour
-

Widely spaced contours indicate a ____ slope.

- ☐ steep
- ☐ gradient
- ☐ vertical
- ☐ gentle



A topographic profile is a cross section that shows the elevations and slopes along a given line.

- ☐ True
- ☐ False



Exercise 1

What is the declination angle of Glenwood Springs?

The Glenwood Springs area is serviced by a variety of roads. Using the classification key on your topographic map, categorize the road that provides access to Lookout Mountain Park.

Glenwood Springs Fish Hatchery is located northwest of Glenwood Springs near the left margin of your topographic map in section 34. What is the distance, in kilometers, of the road from I-70 to the hatchery?

Calculate the area of Lookout Mountain Park using the distances in Data Table 1. The units will be km^2 . (Remember: Area = Length x Width).

Use your measurements in Data Table 1 to convert the ground distances of the length and width of the downtown park to meters.

Calculate the area of the downtown park (in m^2) using the distances you calculated in Question 5.

Data Table 1: Glenwood Springs Map Distances
(SAMPLE ANSWER BELOW)

Location	Map Distance (cm)	Ground Distance (cm)	Ground Distance (km)
Ski Lift	5.8	139,200	1.392
Section of I-70	14.5	348,000	3.48
Lookout Mountain Park length	1.55	37,200	0.37
Lookout Mountain Park width	1.80	43,200	0.43
Downtown Park length	0.80	19,200	
Downtown Park width	0.55	13,200	

Exercise 2

How do contour lines depict steep slopes on topographic maps?

Which area on your topographic map has the steepest gradients? Include the nearest location names and the reason for your answer.

Compare and contrast the terrain in section 15 (upper left corner) and the terrain in section 30 (lower right corner) of the topographic map. What are the overall characteristics of the terrain in each section? Give the average elevation (estimated) and relief of each section.

Oasis Creek is located in sections 24 and 25 in the upper central portion of the map. What direction does the creek flow? Explain how you determined the direction of flow.

Data Table 2: Elevation Data for Glenwood Springs Quadrangle
(SAMPLE ANSWER BELOW)

Map Information	Answer
Contour interval	40 feet
Number of contours between index contours	4
Distance between each index contour	200 feet
Index contour with the highest elevation	10,400 feet

Highest labeled point of elevation (elevation shown next to a small “x”)	10,375 feet
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Data Table 3: Elevations of Map Points
(SAMPLE ANSWER BELOW)

Location	Elevation
Gravel Pit	7,020 ft
Glenwood Springs Golf Course	5,920 ft
Cave	7,100 ft

Data Table 4: Ski Lift Measurements and Calculations
(SAMPLE ANSWER BELOW)

Measurement	Answer
Measured length of ski lift (inches)	2.25 in
Ski lift distance (feet)	4,500 ft
Ski lift distance (miles)	0.85 mi
Top of ski lift elevation (feet)	7,438 ft
Bottom of ski lift elevation (feet)	5,960 ft
Relief of ski lift (feet)	1,478 ft
Gradient of ski lift (feet/mile)	1,739 ft/mi

Exercise 3

Using the ruler, measure the distance between two of the tick marks along the vertical axis of your profile. Record your distance, in inches, below.

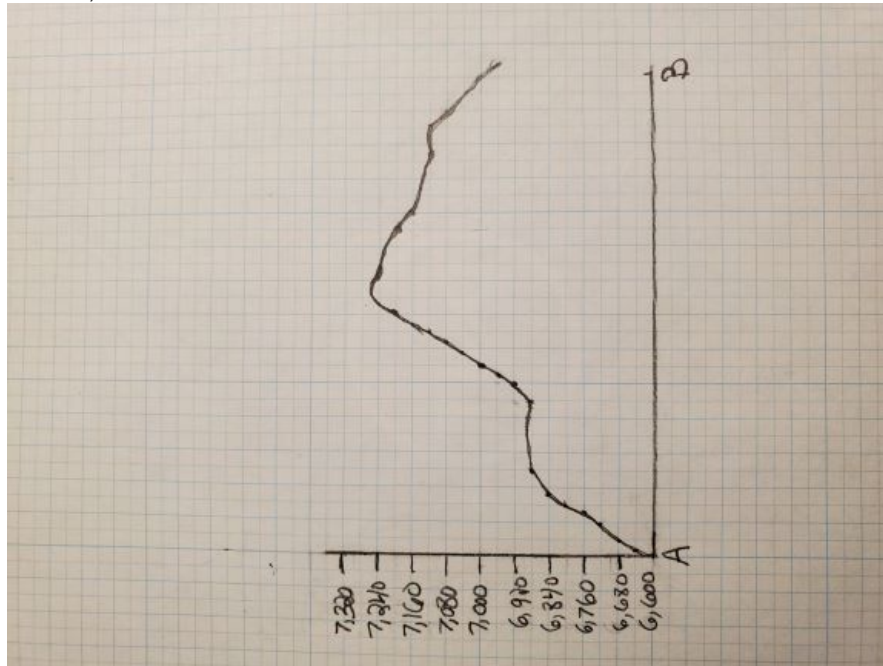
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Why are topographic profiles vertically exaggerated?

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What would a topographic profile along the path of the ski lift look like?

Photo 1: Topographic Profile
(SAMPLE ANSWER BELOW)



Competency Review

When analyzing map distances using the topographic map in Exercise 1, 3 cm on the map would be equal to ____ on the ground.

- ☐ 24,000 cm
- ☐ 48,000 cm
- ☒ 72,000 cm ✓
- ☐ 96,000 cm

____ scales on a topographic map compare like units of measurement.

- ☒ Fractional ✓
- ☐ Bar
- ☐ Declination
- ☐ Contour

Vertical exaggeration occurs on a topographic profile because the vertical scale is typically larger than the horizontal scale.

- ☒ True ✓
- ☐ False

The top elevation of a hill on a topographic map is 420 feet, and the bottom elevation is 240 feet. What is the relief of the hill?

- ☐ 120 feet
- ☐ 160 feet
- ☒ 180 feet ✓
- ☐ 200 feet

A depression is indicated on a topographic map by intersecting contour lines.

- ☐ True
- ☒ False



When creating the topographic profile in Exercise 3, what did the y-axis represent?

- ☐ Gradient
- ☒ Elevation
- ☐ Relief
- ☐ Distance



A mountain on a topographic map has a relief of 2600 feet over 2.5 miles. What is the gradient of the mountain?

- ☐ 840 feet/mile
- ☐ 940 feet/mile
- ☒ 1040 feet/mile
- ☐ 1140 feet/mile



_____ is the difference between magnetic north and true north.

- ☐ Gradient
- ☐ Relief
- ☐ Exaggeration
- ☒ Declination



The presence of a river or stream on a topographic map is indicated by a V pattern that points toward a higher elevation.

☒ True

☐ False

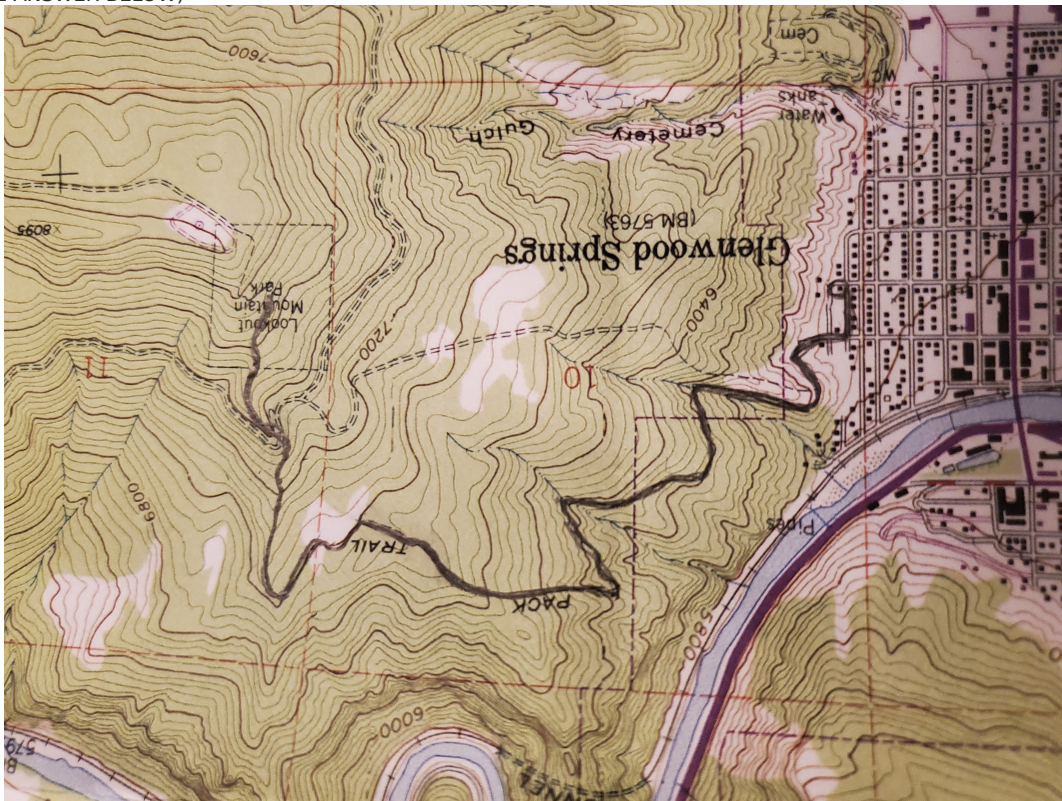


Extension Questions

You decide to take a hike from the house you are staying on the east side of Glenwood Springs to Lookout Mountain Park.

Using the topographic map from the Experimentation section, pick one of the black squares (homes) on the eastern edge of the town of Glenwood Springs as your starting point and circle it with a pencil. Trace the route you would take from the house to the middle of Lookout Mountain Park, keeping in mind you want to make the hike as easy as possible. Take a photo of your route and upload it here.

(SAMPLE ANSWER BELOW)



The routes selected by students may vary.

Explain the route you chose in Question 1 and why you chose the route. (SAMPLE ANSWER BELOW)

Answers will vary depending on the route chosen, but students should justify the decisions they made for the route they chose. If they look closely, they will notice a hiking trail that leads to the park. Getting to the trail and following it would be the simplest option.
