Base your answers to questions 1 through 3 on the topographic map below. Points A through D are locations on the map. Elevations are in feet.



1. On the grid provided above, construct a profile of the land surface between point C and point D by following the directions below.

a Plot the elevations along line *CD* by marking with a dot each point where an isoline is crossed by line *CD*.

b Connect the dots to complete the profile.

2. Determine the gradient from point A to point B by following the directions below.

a Write the equation for determining the gradient.

b Substitute data from the map into the equation.

c Calculate the gradient and label it with the proper units.

3. Explain briefly how the map can be used to determine that Jones Creek is flowing westward into Jones Lake.

4. Base your answer to the following question on the data table below, which lists some properties of four minerals that are used as ores of zinc (Zn).

Mineral	Mineral				
Property	Smithsonite	Sphalerite	Willemite	Zincite	
Composition	ZnCO ₃	ZnS	Zn ₂ SiO ₄	ZnO	
Hardness	4–4.5	3.5–4	5.5	4	
Density (g/cm ³)	4.4	4.0	4.0	5.6	
Color	white, gray, green, blue, yellow	brown, yellow, red, green, black	white, yellow, green, reddish brown, black	deep red to orange yellow	
Streak	white	white to yellow to brown	white	orange yellow	

A sample of sphalerite has a mass of 176.0 grams. What is the volume of the sample?

A) 22.7 cm³ B) 31.4 cm³ C) 40.0 cm³ D) 44.0 cm³

- 5. A person knows the solar time on the Prime Meridian and the local solar time. What determination can be made?
 - A) the date
 - B) the altitude of Polaris
 - C) the longitude at which the person is located
 - D) the latitude at which the person is located

6. Base your answer to the following question on on the topographic map below. Points A, B, X, and Y are locations on Earth's surface.



7. Base your answer to the following question on "the map below and the cross sections on the next page. The map shows a portion of the Indian Ocean and surrounding landmasses. The location of the epicenter of a large undersea earthquake that occurred on December 26, 2004, is shown by an X. The isolines surrounding the epicenter show the approximate location of the first tsunami wave produced by this earthquake in half-hour intervals after the initial earthquake. Cross sections I and II illustrate how this undersea earthquake produced the tsunami. Cross section III shows the tsunami approaching a shoreline. The cross sections are not drawn to scale.





State the latitude and longitude of the epicenter of this earthquake. Include the units and compass directions in your answer.

8. Base your answer to the following question on your knowledge of Earth science. The map shows an area of New York State that includes a campsite, trail, and buildings near a lake. Points *A*, *B*, *C*, and *D* represent locations on the map.



Circle the phrase that indicates the direction of flow of Woodland Brook. Describe the contour-line evidence that supports your answer.

9. Base your answer to the following question on the time-exposure photograph shown below. The photograph was taken by aiming a camera at a portion of the night sky above a New York State location and leaving the camera's shutter open for a period of time to record star trails.



During the time exposure of the photograph, the stars appear to have moved through an arc of 120°. How many hours did this time exposure take?

A`	1 5 h	B) 8 h	C) 12 h	D) 15 h
A,	5 11	D) 8 II	C) 12 II	D D

Base your answers to questions 10 and 11 on

the topographic map below and on your knowledge of Earth science. Some contour lines have been drawn. Line *AB* is a reference line on the map.



10. State a likely surface elevation of Pebble Lake.

11. On the map, draw the 60-meter and 70-meter contour lines. The contour lines should extend to the edges of the map.

12. Base your answer to the following question on "the map below, which shows the generalized surface bedrock for a portion of New York State that appears in the Earth Science Reference Tables.



State the longitude of Mt. Marcy, New York, to the nearest degree. The units and compass direction must be included in your answer.

Base your answers to questions 13 and 14 on "the topographic map below. The map shows a portion of the Taterskill Creek flowing past the towns of Lawson and Glenton. The shaded area is Taterskill Creek. The arrows in the creek show its direction of flow. Points A, B, and C are locations on the map. Points A and B are connected with a reference line.

Mercado Dam is located 32 miles upstream from Lawson. In the remote possibility of a failure of the Mercado Dam, the Taterskill Creek is expected to rise to the 600-foot contour line in the vicinity of the two towns.



13. On the grid provided below, construct a topographic profile from point A to point B, following the directions below.



Distance (mi)

a Write numbers along the vertical axis to show an appropriate scale for the elevations crossed by line AB. Your number scale should label at least half of the lines along the vertical axis and should not extend beyond the grid provided.

b Plot the elevation along line AB by marking an X at each point where a contour line is crossed. Point A and point B have been plotted for you.

c Connect all the Xs to complete a profile that accurately reflects the elevation of the land.

14. State a possible elevation for point C on the map.

Base your answers to questions 15 and 16 on "the topographic map shown below. Points A, B, C, and D are reference points on the map. Elevations are measured in meters.



15. Calculate the gradient of Long Creek between points C and D and label the answer with the correct units.

16. On the grid provided below, construct a topographic profile along line *AB*, by plotting a point for the elevation *of each* contour line that crosses line *AB* and connecting the points with a smooth, curved line to complete the profile.



17. Approximately what are the coordinates of the Hawaii Hot Spot?

A) 50° N, 120° W	B) 25° N, 158° E
C) 25° N, 158° W	D) 25° S, 158° E

Base your answers to questions 18 and 19 on "the temperature field map below. The map shows temperature readings (°C) recorded by students in a science classroom. The readings were taken at the same time at floor level. Temperature readings for points A and B are labeled on the map.



- 18. On the temperature field map, use solid lines to draw the 18°C, 20°C, and 22°C isotherms. Isotherms must extend to the boundary of the map. Label each isotherm to indicate its temperature.
- 19. Determine the temperature gradient from point A to point B by following the directions below.
 - a Write the equation used to determine the gradient.
 - *b* Substitute values from the field map into the equation.
 - c Solve the equation and label the answer with the proper units.

20. Base your answer to the following question on the temperature field map below. the map shows 25 measurements (in °C) that were made in a temperature field and recorded as shown. The dots represent the exact location of the measurements. *A* and *B* are locations within the field.

Temperature Field Map (°C)				
• 23	• 24	• 25	A • 27	•26
• 23	• 24	• 25	• 26	•26
• 22	• 23	• 24	• 25	•25
• 21	• 22	B 24	• 24	• 24
• 20	• 22	• 21	•22	_ 22
0	1.0 	2.0 meters	3.0	4.0

On the temperature field map above, draw three isotherms: the 23°C isotherm, the 24°C isotherm, and the 25°C isotherm.

21. New York State's highest peak, Mt. Marcy, is located at approximately	22. The diagram below represents an observer measuring the altitude of <i>Polaris</i> .	
A) 44°10' N 74°05' W B) 44°05' N 73°55' W	Zenith Polaris	
C) 73°55' N 44°10' W D) 74°05' N 44°05' W	37° 53° Horizon	
	At which latitude is this observer located?	
	A) 16° N B) 37° N	
	C) 53° N D) 90° N	

23. The map below shows four major time zones of the United States. The dashed lines represent meridians of longitude. The locations of New York City and Denver are shown.



What is the time in New York City when it is noon in Denver?

A) 10 a.m. B) 2 p.m. C) 3 p.m. D) noon

- 24. Which New York State city is located at 42°39' N 73°45' W?
 - A) Buffalo B) Albany
 - C) Ithaca D) Plattsburgh