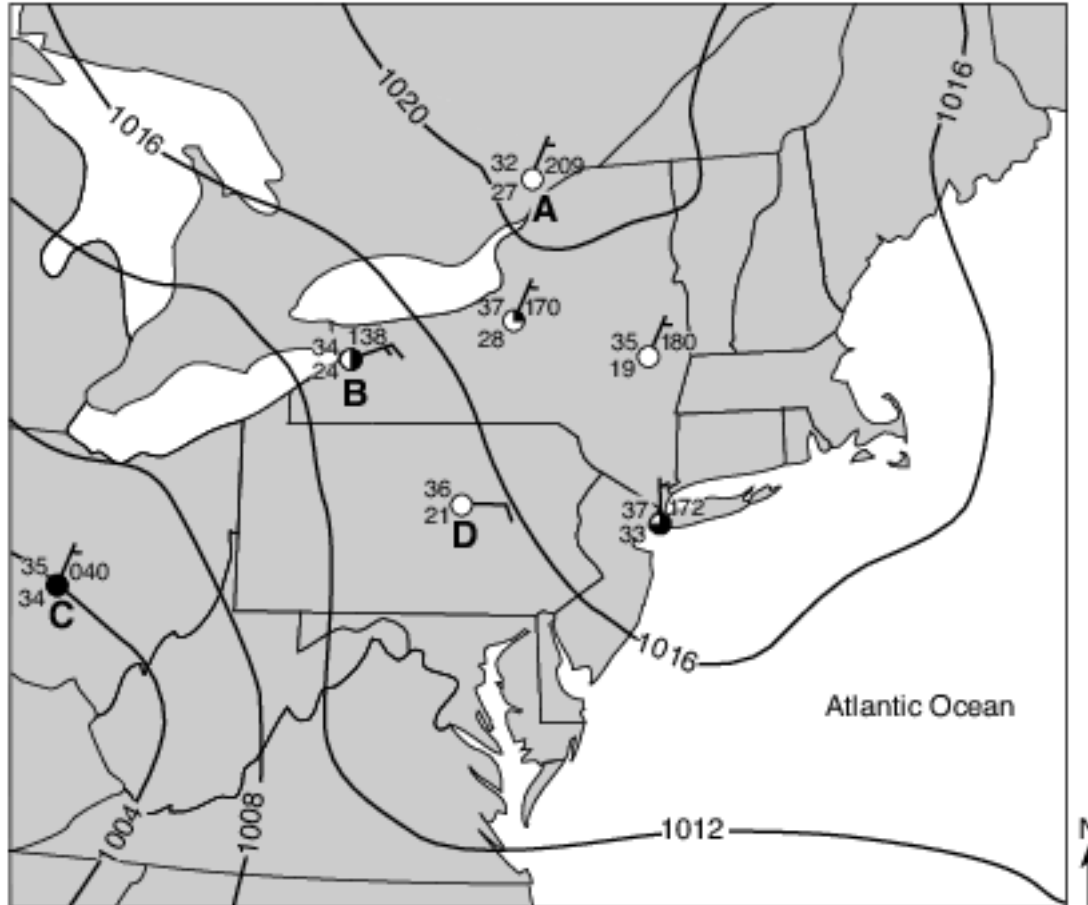


Weather Variables

Base your answers to questions 1 on the weather map below. The map shows isobars and seven weather station models. Four of the weather stations are identified by letters A, B, C, and D.



- 1 What was the probable air pressure, in millibars, at station D?

(1) 1015.0 mb	(3) 1021.0 mb
(2) 1017.0 mb	(4) 1036.0 mb

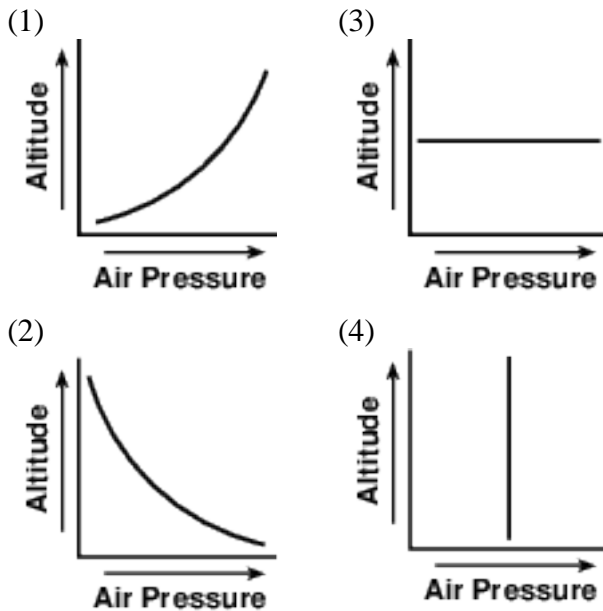
- 2 A dry-bulb temperature of 30°C and a wet-bulb temperature of 29°C were recorded at a weather station. What are the relative humidity and the most likely weather conditions?

(1) Relative humidity is 29% with clear skies.	(3) Relative humidity is 93% with clear skies.
(2) Relative humidity is 29% with a good chance of snow.	(4) Relative humidity is 93% with a good chance of rain.

- 3 What is the dewpoint when the dry-bulb temperature is 12°C and the wet-bulb temperature is 7°C?

(1) 1°C	(3) 28°C
(2) -5°C	(4) 48°C

8 Which graph best shows the general relationship between air pressure and altitude?



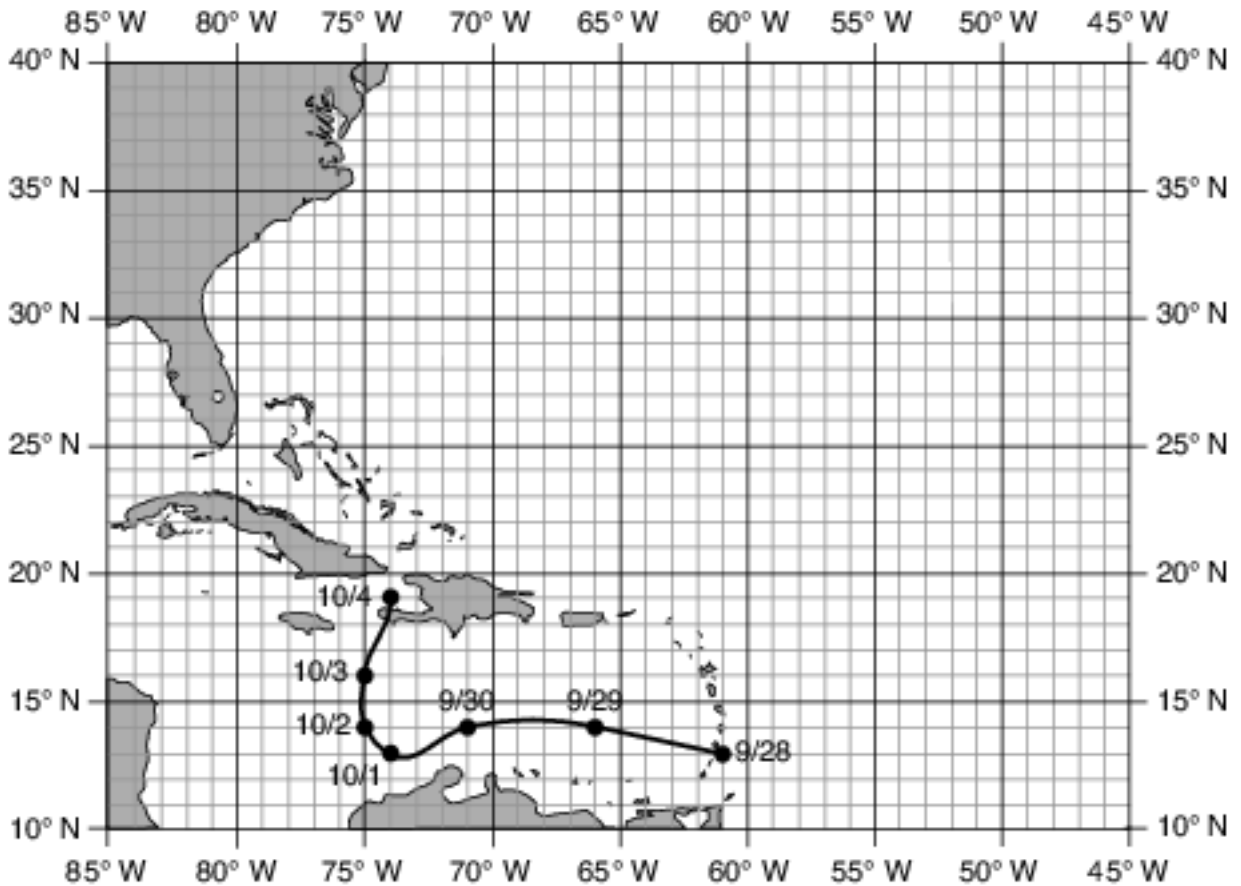
Base your answers to questions 9 on the data table below, on the map in image provided, and on your knowledge of Earth science. The table lists storm data for Hurricane Matthew, which occurred in the fall of 2016. Air pressure, wind speed, and storm location are shown for the hurricane's center at the same time each day. The map shows the location of Hurricane Matthew from September 28 to October 4.

Hurricane Matthew Data

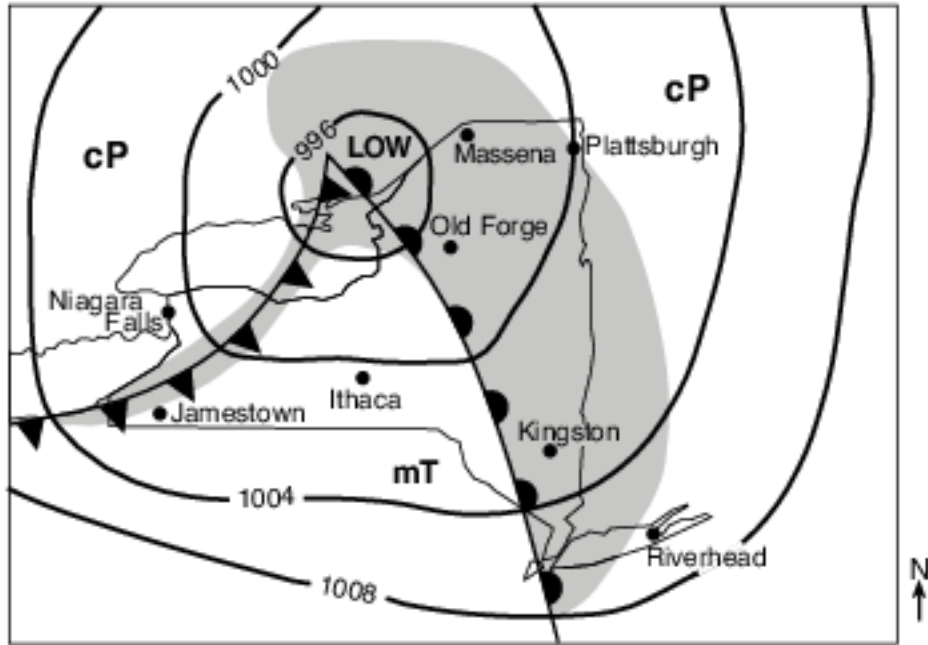
Date	Air Pressure (mb)	Wind Speed (mph)	Location of Storm Center
Sept. 28	1008	60	13° N, 61° W
Sept. 29	995	70	14° N, 66° W
Sept. 30	968	115	14° N, 71° W
Oct. 1	946	145	13° N, 74° W
Oct. 2	946	140	14° N, 75° W
Oct. 3	941	140	16° N, 75° W
Oct. 4	949	145	19° N, 74° W
Oct. 5	962	120	22° N, 75° W
Oct. 6	940	140	25° N, 78° W
Oct. 7	946	120	29° N, 81° W
Oct. 8	967	75	33° N, 79° W
Oct. 9	984	75	35° N, 74° W

- 9 On the map in the image provided, complete the path of Hurricane Matthew by plotting the location of the storm center for October 5 through October 9. Draw a line to connect all five of these plots to the October 4 plot to complete the path. [1]

Hurricane Tracking Map
Hurricane Matthew, Fall 2016



Base your answers to questions 10 on the weather map below and on your knowledge of Earth science. The map shows the location of a low-pressure system over New York State during late summer. Isobar values are recorded in millibars. Shading indicates regions receiving precipitation. The air masses are labeled. Eight locations in New York State are indicated.

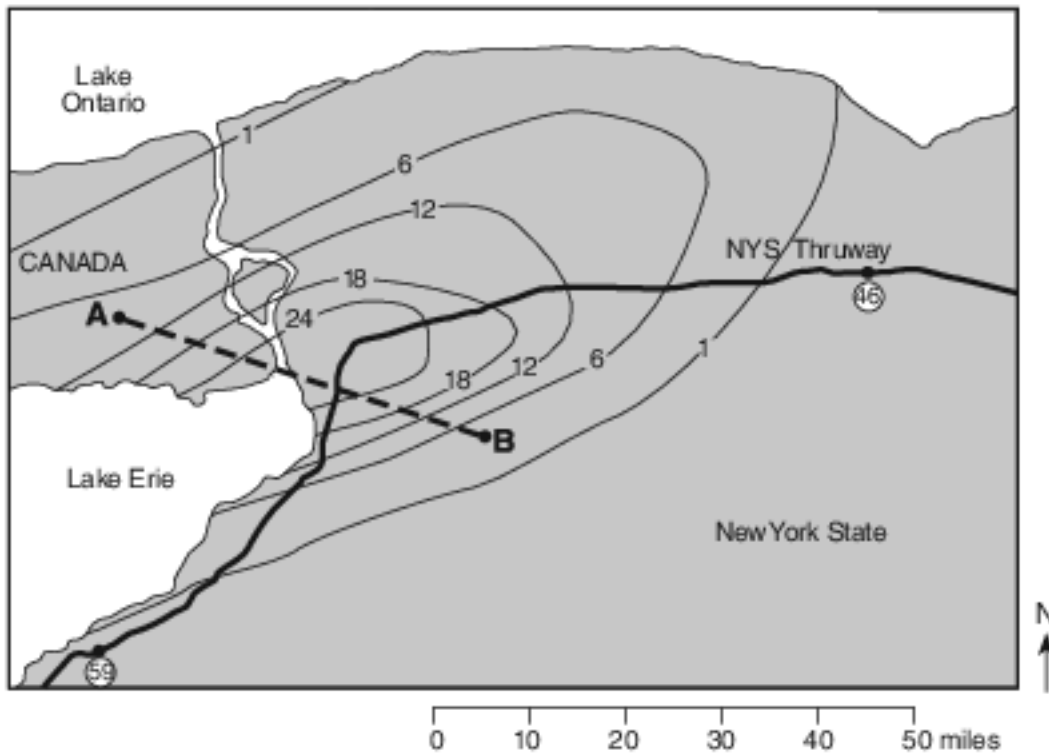


- 10 Identify the location labeled on the map that will next experience a short burst of heavy precipitation, a change in wind direction, and a rapid decrease in temperature. [1]

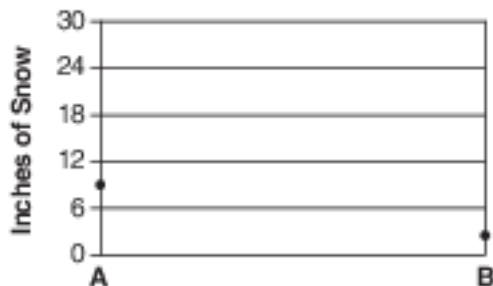
Base your answers to questions 11 on the map and passage below.

A Lake-Effect Snowstorm

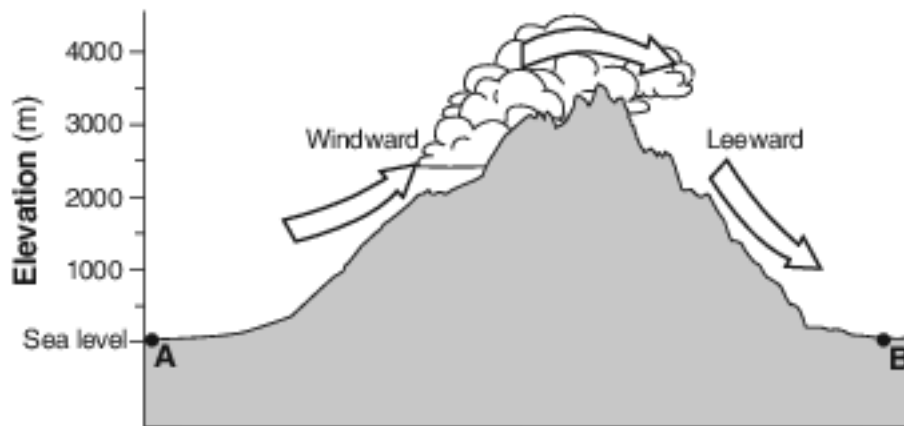
A snowstorm affected western New York State on October 12 and 13, 2006. A blend of weather conditions caused more than 24 inches of heavy, wet, lake-effect snow, bringing much of western New York to a standstill. The New York State Thruway was closed to traffic between exits 46 and 59, which are circled on the map. The isolines on the map show the amount of snowfall, measured in inches, resulting from this storm. Points A and B represent locations on Earth's surface.



- 11 On the grid in the image provided, construct a profile of the snowfall amounts along line AB by plotting the isoline amounts that cross line AB. The amounts for points A and B have been plotted. Complete the profile by connecting all the plots with a line. [1]

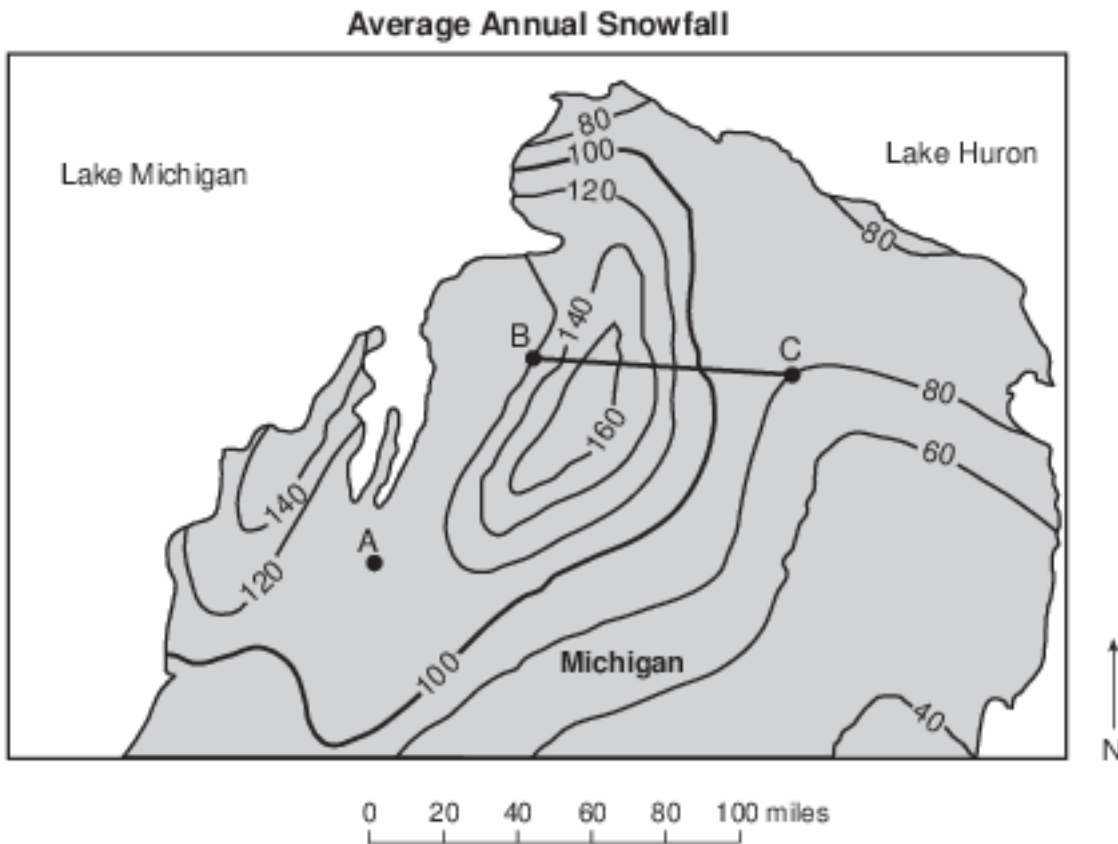


Base your answers to questions 12 on the diagram below, which shows the windward and leeward sides of a mountain range. Arrows show the movement of air over a mountain. Points A and B represent locations at sea level on Earth's surface.



- 12 What is the relative humidity at the base (bottom) of the cloud on the windward side of the mountain? [1]
%

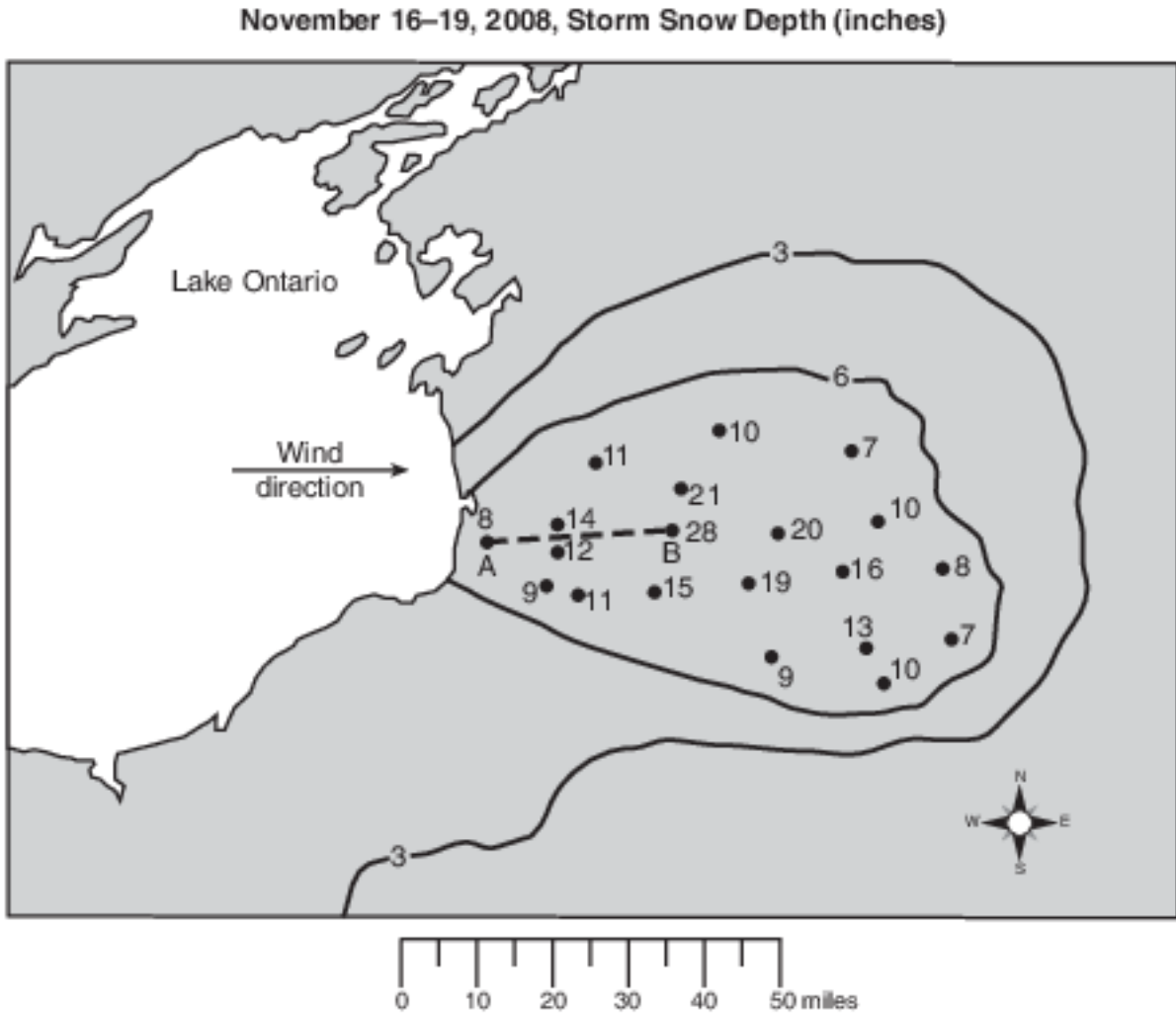
Base your answers to questions 13 on the maps below and on your knowledge of Earth science. The snowfall map shows isolines of average annual snowfall, measured in inches, across part of Michigan between two of the Great Lakes. Letters A through C represent locations on Earth's surface. The snowfall map is an enlargement of the map area outlined on the following Great Lakes regional map.



- 13 State the average annual snowfall at location A. [1]
in

Base your answers to questions 14 on the snowfall map of the Tug Hill Plateau region of New York State in image provided and on your knowledge of Earth science. A lake-effect snowstorm occurred on November 16–19, 2008. Snow depths are indicated in inches at several points and by two labeled isolines. Dashed line AB is a reference line on the map between two recorded snow depths.

14 On the map in the image provided, draw the 9-inch and 12-inch snow depth isolines. [1]

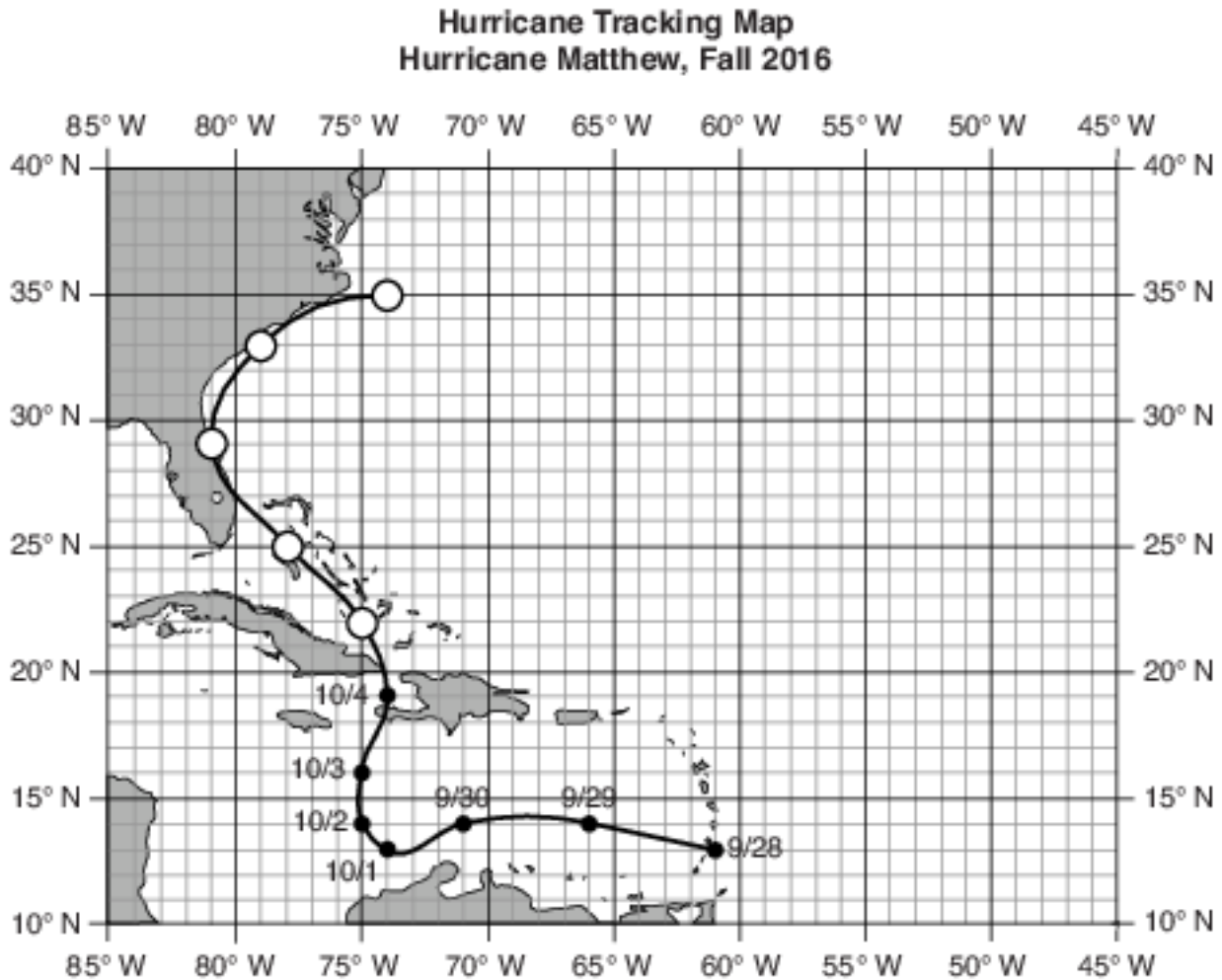


Base your answers to questions 15 on the weather map in image provided and on your knowledge of Earth science. The weather map shows the center of a high-pressure system (H) and the center of a low-pressure system (L) affecting North America. Isobars are drawn for the eastern portion of the map, and one isobar is drawn around the high-pressure center. Air pressures are shown at various points in the western portion of the map. All air pressures were recorded in millibars (mb). Points A through F represent surface locations.

15 Convert the air pressure at location A from millibars (mb) to inches of mercury (in of Hg). [1]
 _____ in of Hg

Answer Keys

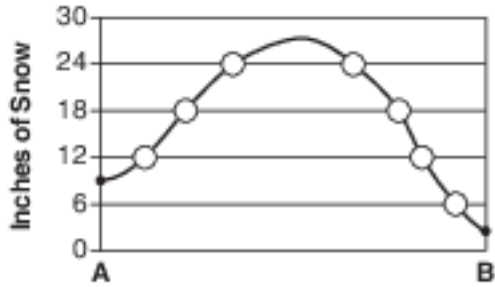
- 1 1
- 2 4
- 3 1
- 4 2
- 5 1
- 6 4
- 7 4
- 8 2
- 9 Allow 1 credit if all five plots are within or touch the circles shown below and are correctly connected with a line (beginning at the 10/4 plot) that passes within or touches each circle.
 - Note: Allow credit if the line does not pass through the student plots, but is still within or touching the circles.
 - It is recommended that an overlay of the same scale as the student answer booklet be used to ensure reliability in rating.
 -



- 10 Allow 1 credit for Jamestown.

11 Allow 1 credit if all seven student plots are within the circles shown below and are connected with a line from A to B that passes within the circles. The line must extend above 24 inches and below 30 inches.

- Note: It is recommended that an overlay of the same scale as the student answer booklet be used
- to ensure reliability in rating.



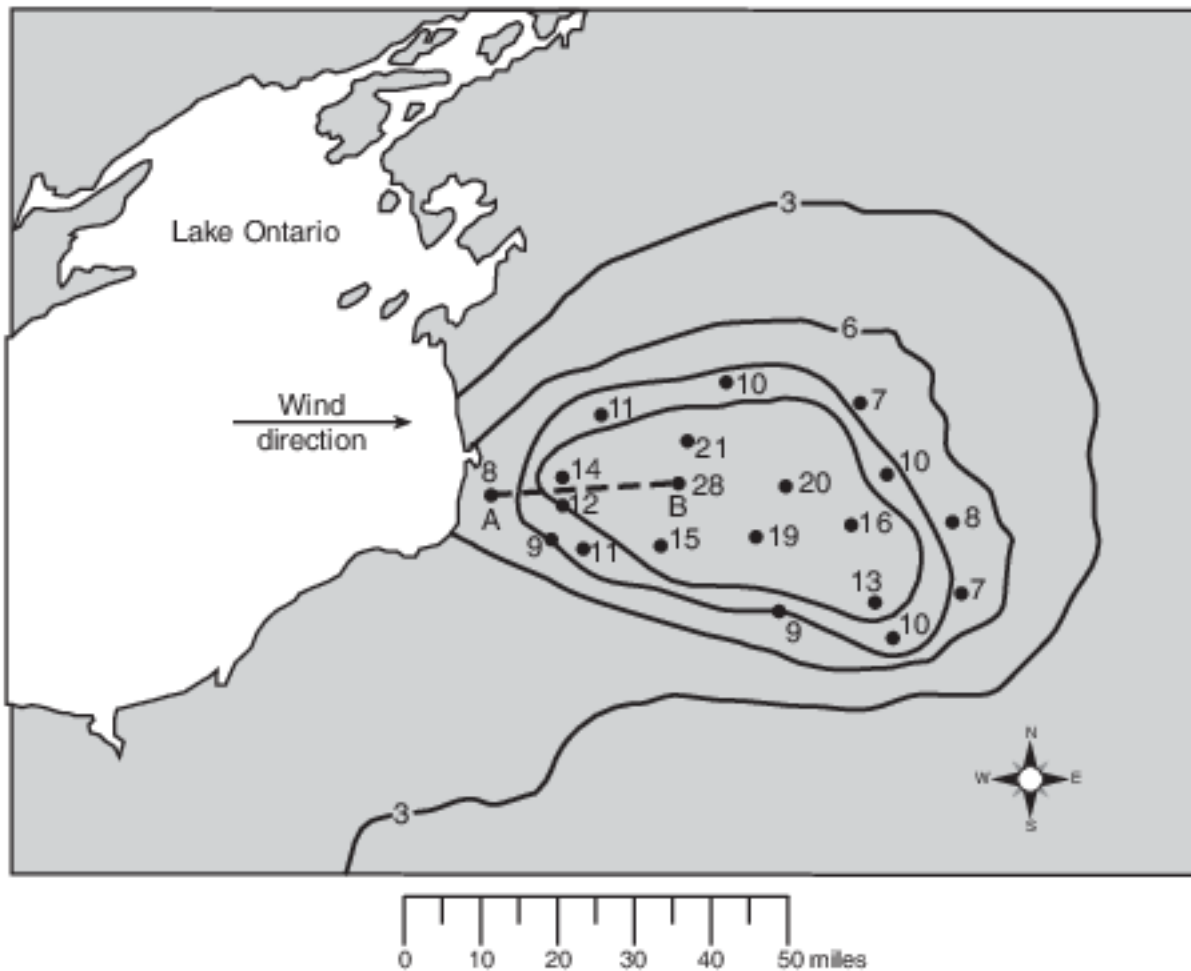
12 Allow 1 credit for 100%.

13 Allow 1 credit for any value greater than 100 in but less than 120 in.

14 Allow 1 credit for correctly drawn 9-inch and 12-inch snow depth isolines. If additional isolines have been drawn, all isolines must be correct to receive credit.

- Example of a 1-credit response:

November 16–19, 2008, Storm Snow Depth (inches)



15 Allow 1 credit for 30.12 in of Hg.