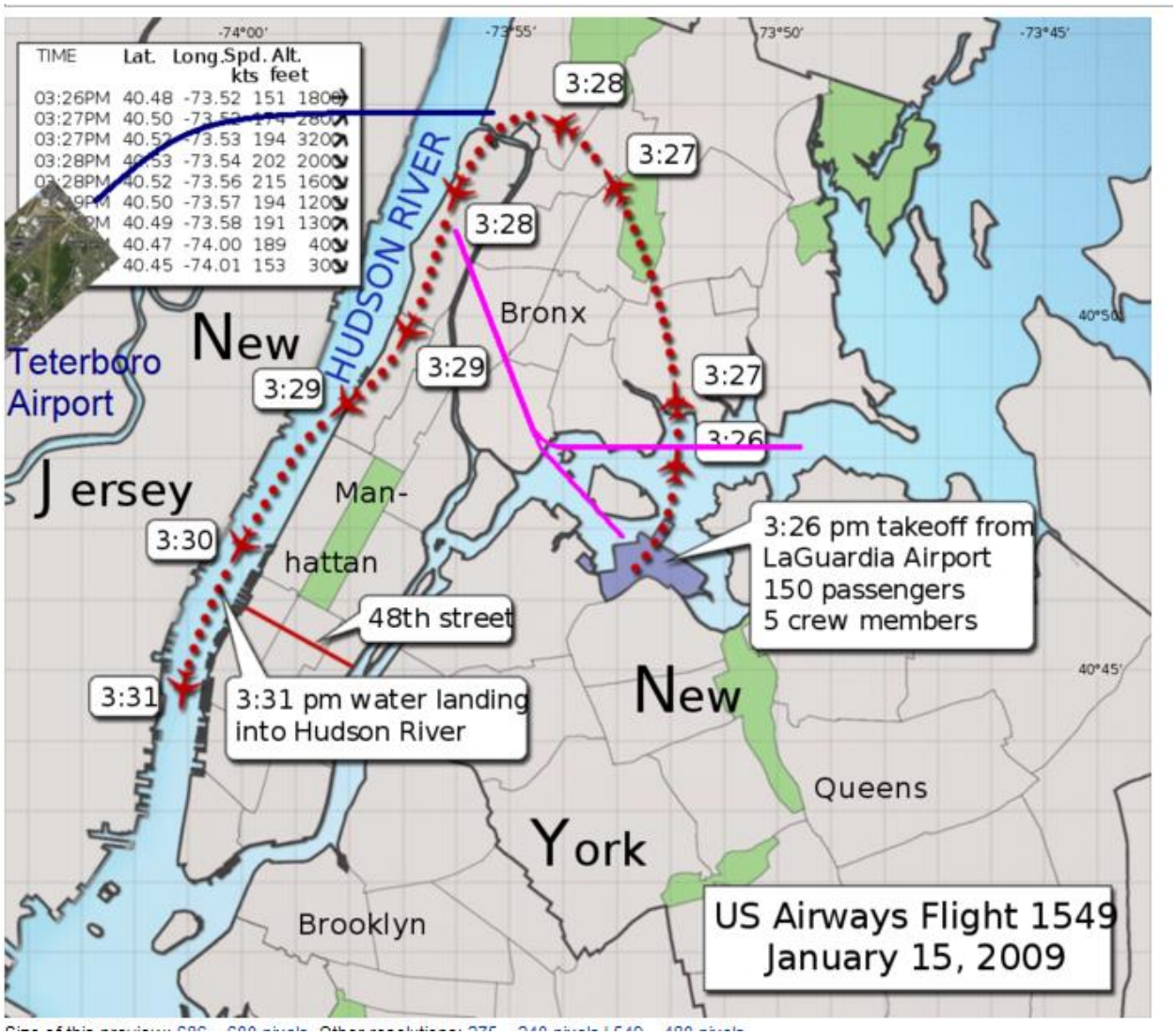
Name _____ Hour _____ Score _____/ 40

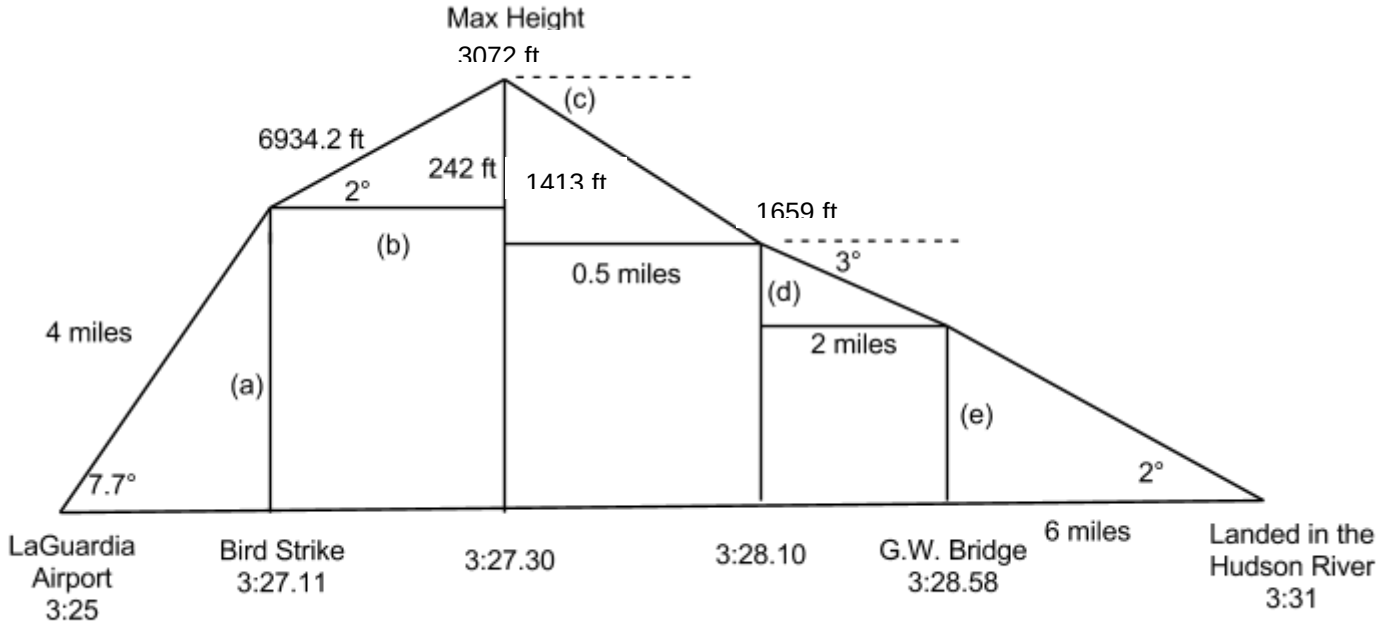
GEOMETRY: FLIGHT 1549

On January 15, 2009 at approximately 3:30 PM (ET), US Airways flight 1549 made an emergency water landing in the Hudson River in New York as a result of a bird strike (a large flock of Canadian geese). There were 150 passengers on board and five crew members. There were no fatalities and only minor injuries. Passengers were assisted by emergency first responders from the New York/New Jersey area as well as by ferry companies.



Watch the flight simulation in the video.
Flight Simulation: http://www.youtube.com/watch?v=tE_5eiYn0D0

Use the diagram below for your calculations:



1.) The plane left LaGuardia airport at 3:25pm and about 2 minutes later struck a flock of birds (3:27.11pm). The plane was 4 miles from LaGuardia airport and was ascending at an angle of elevation of 7.7° degrees. Calculate the plane's height above ground level at the time of the bird strike (a). *(4 points)*

Note: 1 mile = 5280 ft

The plane still climbed in altitude after the bird strike even after they lost thrust on both engines for 19 more seconds (3:27.30pm) reaching a maximum height of 3072 feet.

2.) If the plane climbed 242 more feet at an angle of elevation of 2° degrees, how much further did the plane travel to reach its maximum height in miles (b)? *(4 points)*

3.) At this point, the plane started descending. As the plane turned, its altitude dropped from 3072 feet to 1659 feet above ground level. Calculate the angle of depression if the plane traveled 0.5 miles (c). (Note: the difference in altitude is 1413 feet) *(4 points)*

4.) The plane continued to descend, but leveled off to an angle of descent of 3° degrees for approximately 2 miles. How many feet did the plane drop in altitude (d)? *(4 points)*

5.) The plane landed in the Hudson River at an angle of descent of 2° degrees traveling 6 more miles. At what height did the airplane cross over the George Washington Bridge (e)? *(4 points)*

b.) If the bridge is 212 feet above the water, by how many feet did the airplane clear the bridge? *(1 point)*

c.) Air Traffic Control at LaGuardia Airport reported seeing the aircraft pass less than 900 feet above the George Washington Bridge. Does your calculation support that statement? *(1 point)*

6.) Calculate the total distance the plane traveled. (Hint - Notice the 5 triangles in the diagram above. Solve for the hypotenuse of each triangle) *(10 points)*

***Take a closer look at what happened on Flight 1549 in the interview with the pilot, Sully Sullenberger**
60 Minute Interview with Katie Couric https://www.youtube.com/watch?v=rZ5HnyEQg7M

7.) Why do you think the pilot did not turn back to LaGuardia airport? (*1 point)*

8.) The pilot, Sully Sullenberger, made the decision to land in the Hudson River when he was 1659 feet above the ground descending at 2° degrees, which was 30 seconds after the bird strike. Would he have been able to make it back to LaGuardia Airport? Remember he landed within 8 miles from making the decision to land in the Hudson River. (Note: 1 mile = 5280 ft) Support your answer by finding the horizontal distance back to LaGuardia Airport. *(2 points)*

b.) Does your calculations support this statement given by National Transportation Safety Board (NTSB)? *(1 point)*

NTSB ran a simulation at Airbus facilities in Toulouse, France to duplicate the flight operated by Sullenberger.

"In the setup there were two important differences from the actual flight. First, the starting point was the location of the bird strike itself, not the location where Sullenberger came out of his turn. Second, the pilots knew the game in advance." When the four pilots participating in the simulation responded immediately to the loss of power from the bird strike, all four were able to return safely to LaGuardia. However, in recognition that it wasn't reasonable to expect a pilot to assess the situation and react instantly, the NTSB imposed a 30-second delay before simulator pilots could turn back to LaGuardia and every one of them crashed.

9.) Why couldn't Sullenberger head to the Teterboro airport in New Jersey? Thirty seconds after the point of impact with the bird, Teterboro was 6.5 miles away from the plane. *(1 point)*

10.) The plane was going 150 knots when it landed in the Hudson River. What was the plane's speed in miles per hour (mph). Note: 1 knot = 1.15 mph. *(1 point)*

11.) Do you think the airline's emergency procedures helped in this successful rescue? How important was it that the passengers were wearing their seatbelts? *(1 point)*

12.) On January, 15, 2009, the air temperature in NYC was 20 °F and the water was 36 °F. Why did the pilot land the plane near the ferry boats? *(1 point)*

Note: A water temperature of 50 °F often leads to unconsciousness in one hour, and water temperatures hovering at freezing 32 °F can lead to unconsciousness in as little as 15 minutes.

****Watch this clip from "The Early Show"**
Survivors and first responders talk about the day Flight 1549 landed in NY's Hudson River
https://www.youtube.com/watch?v=Ei30rFzwI9Q