

EXAMPLE 4 Describing Lift for Airplanes

For a given wing area, the lift of an airplane (or a bird) is proportional to the square of its speed. The table shows the lifts for a Boeing 737 airplane at various speeds.

Speed (mph)	0	75	150	225	300	375	450	525	600
Lift (1000s of lb)	0	25	100	225	400	625	900	1225	1600

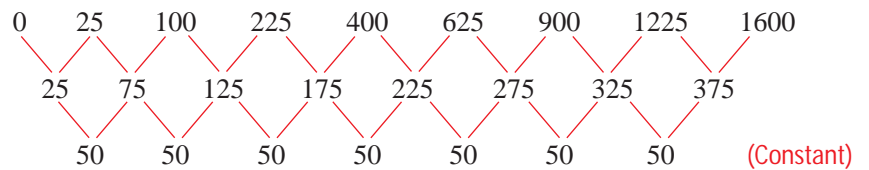


- a. Is the pattern of the lifts quadratic? Why?
- b. Sketch a graph to show how the lift increases as the speed increases.

The Boeing 737 is the most widely used commercial jet in the world. It represents more than 25% of the world's fleet of large commercial jet aircraft.

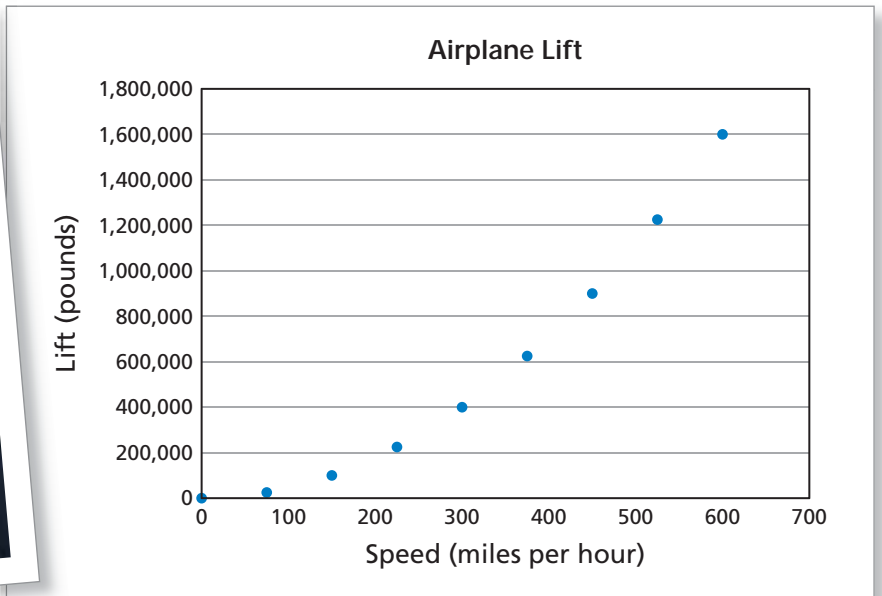
SOLUTION

- a. Begin by finding the second differences of the lifts.



Because the second differences are constant, the pattern is quadratic.

- b. Notice that as the speed increases, the lift increases quadratically.



✓ Checkpoint

Help at Math.andYOU.com

A Boeing 737 weighs about 100,000 pounds at takeoff.

- c. Estimate how fast the plane must travel to get enough lift to take flight.
- d. Explain why bigger planes need longer runways.