

Flight of an Osprey

An observer in a fishing boat watched as an osprey dove under water and re-emerged with a fish in its talons. The following table shows the bird's estimated height above the water as given by that observer.

Time (s)	Height (m)
0	7
2	10
4	5
6	0
7	0
8	3



- ? Is the osprey travelling at its greatest speed when it hits the water?**
- Plot the given data on graph paper. What type of function best models these data?
 - Without using graphing technology, determine an equation to model the data and state a suitable domain.
 - Describe the osprey's flight, making reference to your graph and equation. Include information about the time, its height, direction of flight, and relative rate of ascent and descent (faster/slower).
 - According to your model, how long was the osprey under water? Does this seem reasonable? Explain.
 - According to your model, when was the osprey more than 6 m above the water?
 - Use your model to estimate the rate at which the osprey's height is changing at the time it hits the water.
 - Using tangent lines on your graph, do you think the rate you calculated in part F is the greatest at this point? Explain.
 - Check your result for part F using graphing technology by creating a scatter plot, determining the equation of the curve of best fit, and using it to find the slope of the appropriate tangent line.
 - Use the graphing calculator and the graph you created in part H to help you determine when the osprey's rate of change in height was greatest between 0 s and 8 s.

Task Checklist

- ✓ Did you explain your thinking clearly?
- ✓ Did you justify your answers mathematically?
- ✓ Did you show all work and calculations?
- ✓ Did you check your calculations?
- ✓ Did you label your work properly?