

Definitions:

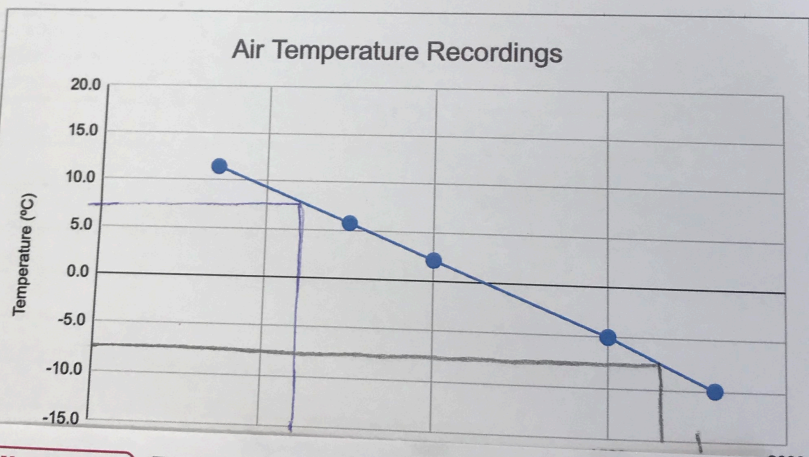
Interpolate: estimate values within known values

Extrapolate: estimate values outside of known values (extend and add extra)

**Example 1: Solve a Problem Using Interpolation**

A weather balloon recorded the air temperature at different altitudes. The data approximately represent a linear relationship.

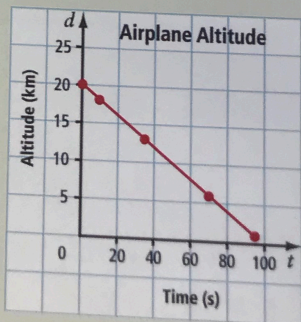
Altitude, $a$ (m)	350	750	1000	1500	1800
Temperature, $t$ ( $^{\circ}\text{C}$ )	11.4	5.7	2.1	-5.0	-10.0



**Show You Know** Ex. 1

This graph shows a plane's altitude as it lands. The relationship between altitude and time is approximately linear.

- a) What was the plane's approximate altitude at 50 s?
- b) At what time was the plane's altitude approximately 11 km?
- c) Is it appropriate to join the points with a straight line? Explain.



**Example 2: Solve a Problem Using Extrapolation**

Anna is kayaking up the east coast of the Queen Charlotte Islands toward Graham Island.

Anna's course is shown by the red arrow on the map.



- a) If Anna continues on her present course, **extrapolate** the values of the coordinates for latitude and longitude where she will land.  $(-131.8^{\circ}, 53.8^{\circ})$
- b) Could you use extrapolation to estimate where Anna sailed from? Explain.

You can extend the graph, but you still need a bigger map.

**Show You Know** Ex. 2

The value of a computer decreases over time. The graph shows the value of a computer after it was bought.

- a) After what approximate period of time does the computer have no value?
- b) When was the computer worth approximately \$200?
- c) Is it appropriate to join the points with a straight line? Explain.

