

## Investigating Changes in Temperature

The following table gives the mean monthly temperatures for Sudbury and Windsor, two cities in Ontario. Each month is represented by the day of the year in the middle of the month.

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day of Year	15	45	75	106	136	167	197	228	259	289	320	350
Temperature for Sudbury (°C)	−13.7	−11.9	−5.9	3.0	10.6	15.8	18.9	17.4	12.2	6.2	−1.2	−10.1
Temperature for Windsor (°C)	−4.7	−3.8	2.3	8.7	14.6	20.2	22.6	22.0	17.9	11.5	4.8	−1.2

**?** Which city has the greatest rate of increase in mean daily temperature, and when does this occur?

- Make a conjecture about which city has the greatest rate of increase in mean daily temperature. Provide reasons for your conjecture.
- Create a scatter plot of mean monthly temperature versus day of the year for each city.
- Draw the curve of best fit for each graph.
- Use your graphs to estimate when the mean daily temperature increases the fastest in both cities. Explain how you determined these values.
- Use your graphs to estimate the rate at which the mean daily temperature is increasing at the times you estimated in part D.
- Determine an equation of a sinusoidal function to model the data for each city.
- Use the equations you found in part F to estimate the fastest rate at which the mean daily temperature is increasing.

### Task Checklist

- ✓ Did you provide reasons for your conjecture?
- ✓ Did you draw and label your graphs accurately?
- ✓ Did you determine when the mean daily temperature is increasing the fastest in both cities?
- ✓ Did you show all the steps in your calculations of rates of change and clearly explain your thinking?