

6.6 Modelling with Trigonometric Functions

Ex. 1 The bottom of a windmill is 8 m above the ground, and the top is 22 m above the ground. The windmill rotates twice every minute.

- Suppose a point starts at the bottom of the windmill, determine a cosine equation that model the height of this point as it travels around the windmill.
- What is the height of this point after 6 seconds, to the nearest tenth of a meter?

Ex. 2 Astronomers have noticed that the number of visible sunspots varies from a minimum of about 10 to a maximum of about 110 per year. Further, this variation is sinusoidal, repeating over an 11 year period.

- If the last maximum occurred in 2003, determine a sinusoidal equation that models this phenomenon in terms of time since year 2000.
- What is the number of visible sunspots in year 1995, to the nearest tenth of a unit?

Ex. 3 (Nelson text p. 361 #7)

A person who was listening to a siren reported that the frequency of the sound fluctuated with time, measured in seconds. The minimum frequency that the person heard was 500 Hz, and the maximum frequency was 1000 Hz. The maximum frequency occurred at $t = 0$ and $t = 15$. The person also reported that, in 15, she heard the maximum frequency 6 times (including $t = 0$ and $t = 15$).

What is the equation that describes the frequency of this siren?

Ex. 4 The average depth of water at the end of a dock is 6 feet. This varies 2 feet in both directions with the tide. Suppose there is a high tide at 4 a.m. If the tide goes from low to high every 6 hours, write an equation that describes the depth of the water as a function of time with $t = 0$ corresponding to 12 a.m.

HOMEWORK: NELSON TEXT p. 361-362 #5-10