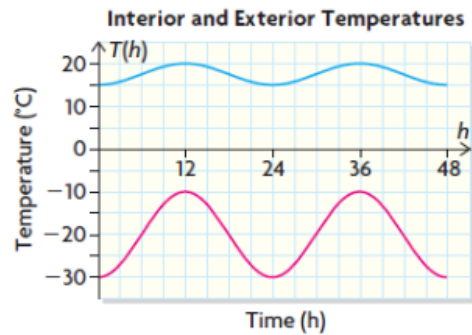


function that describes Charlene's distance from the vertical beam in relation to time.

4. The interior and exterior temperatures of an igloo were recorded over a 48h period. The data were collected and plotted, and two curves were drawn through the appropriate points.
- How are these curves similar? Explain how each of them might be related to this situation.
 - Describe the domain and range of each curve.
 - Assuming that the curves can be represented by sinusoidal functions, determine the equation of each function.



- (a) Both curves have the same period, 24 hours, which tracks temperature variations each day.

The blue curve is indoor temperature, which does not change much due to insulation of snow, and is warmed by trapped body heat & any heat source.

The red curve is outdoor temperature, which is much lower and has much greater variations

(b) $D_{\text{INDOOR}} = \{t \mid t \in \mathbb{R}, 0 \leq t \leq 48\}$

$R_{\text{INDOOR}} = \{T \mid T \in \mathbb{R}, 15 \leq T \leq 20\}$

$D_{\text{OUTDOOR}} = \{t \mid t \in \mathbb{R}, 0 \leq t \leq 48\}$

$R_{\text{OUTDOOR}} = \{T \mid T \in \mathbb{R}, -30 \leq T \leq -10\}$

data collected for 48 hours

(c) $T_{\text{IN}}(t) = -2.5 \cos(15^\circ t) + 17.5$

$T_{\text{OUT}}(t) = -10 \cos(15^\circ t) - 20$