Applications of Sinusoidal Functions II (5.4) p276 day 8

first impressions
accurate or not

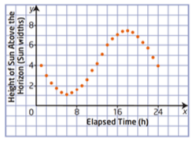
prof evaluations
doctors

thin slicing
how it works

Functions II (5.4) p276 day 8

p276 #9, 10, 15

15. In Inuvik, Northwest Territories (latitude 68.3° N), the Sun does not set for 56 days during the summer. The midnight Sun sequence below illustrates the rise and fall of the polar Sun during a day in the summer.



a) Determine the maximum and minimum heights of the Sun above the horizon in terms of Sun widths.
b) What is the period?
c) Determine the sinusoidal equation that

$d = \frac{7.5+1}{2} = 4.25$

$a = 7.5 - 4.25$

$a = 3.25$

per 24

$b = \frac{2\pi}{24} = \frac{\pi}{12}$

$h(t) = -3.25\sin\frac{\pi}{12}t + 4.25$

9. A point on an industrial flywheel experiences a motion described by the function $h(t) = 13\cos\left(\frac{2\pi}{0.7}t\right) + 15$, where h is the height, in metres, and t is the time, in minutes.
a) What is the maximum height of the point?
b) After how many minutes is the maximum height reached?
c) What is the minimum height of the point?
d) After how many minutes is the minimum height reached?
e) For how long, within one cycle, is the point less than 6 m above the ground?
f) Determine the height of the point if the wheel is allowed to turn for 1 h 12 min.

10. Michelle is balancing the wh bicycle. She has marked a po tire that when rotated can be by the function $h(t) = 59 + 2$ where h is the height, in cent t is the time, in seconds. Dete height of the mark, to the nea centimetre, when $t = 17.5$ s.

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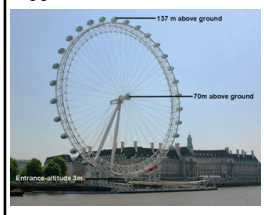
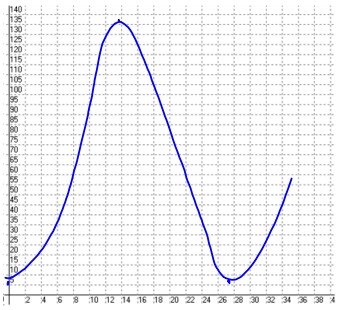
work on ferris wheel sheet



equation= $h(t) = -67\cos\left(\frac{\pi}{14}x\right) + 70$



a= 67

$b = \frac{2\pi}{per} = \frac{2\pi}{28} = \frac{\pi}{14}$

c = 0 −cos

d= 70

$h(t) = 67\cos\left[\frac{\pi}{14}(t-14)\right] + 70$

$h(8.75) = 67\cos\left[\frac{\pi}{14}(8.75-14)\right] + 70$

$= 67\cos\left[\frac{\pi}{14}(-5.25)\right] + 70$

$= 67\cos(-1.178) + 70$

$= 67(0.383) + 70$

$= 95.6$ m

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work on temperatures sheet

Time	Temp
12 am	17.9
1 am	17.7
2 am	16.9
3 am	16.3
4 am	16.4
5 am	16.3
6 am	17.3
7 am	18.3
8 am	19.1
9 am	21
10 am	22.4
11 am	23.4
12 pm	25.4
1 pm	25.4
2 pm	26.1
3 pm	25.8
4 pm	25.7
5 pm	25
6 pm	24.6
7 pm	23.3
8 pm	22.3
9 pm	21.4
10 pm	20.1
11 pm	19
12 am	18

The temperatures in this table were recorded by Environment Canada on July 7, 1995.

Graph the data points. Let t represent the number of hours since midnight.

Use the table to find:

amplitude: 4.85

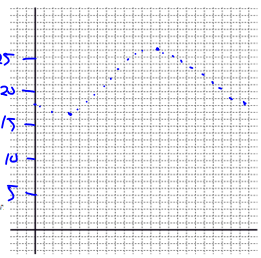
period: 24h b: $\frac{\pi}{12}$

shift: 14

displacement: 21.25

Now write an equation for a cosine function that w

$T(t) = 4.85\cos\left(\frac{\pi}{12}(t-14)\right) + 21.25$



12, 13

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HW: p276 #12, 13, 19