Beca / Hudson / 12.1 IB Math SL
14 March 2019

3.4 Periodic Functions P2 Solutions

a) $12.5 - 6.25 = 6.25$ hours

b) $1.5 - 0.6 = 0.9$ meters

c) $p = \frac{0.9}{2} = 0.45$

d) period $= 6.25 \times 2 = 12.5$ hours

$$12.5 = \frac{2\pi}{q}$$

$$q = \frac{2\pi}{12.5} = 0.16\pi \left(\approx 0.503\right)$$ ~~hours~~

e) $r = \frac{1.5 + 0.6}{2} = 1.05$ m

f) §

$h(49.965\ldots)$ is max

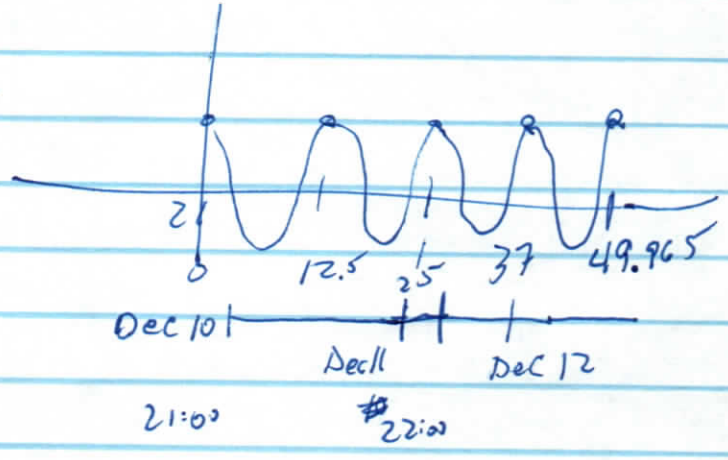
$49.965\ldots - 24 =$

$22.965688\ldots$

$\approx$ ~~22:41.7412...~~

$\approx$ ~~22:42~~

$22:58\ldots \approx 23:00$



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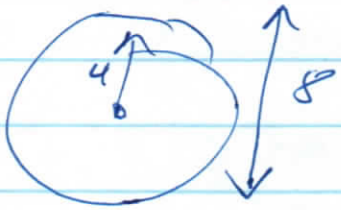
(SP.C4)

3.4 Periodic Functions P2 Solutions

2a) $a = \frac{8}{2} = 4$



b) period $= \frac{2\pi}{b} = 30$

$b = \frac{2\pi}{30} = \frac{\pi}{15}$

c) $\frac{dh}{dt} = \frac{d}{dt}\left(4\sin\frac{\pi}{15}t + 2\right)$

$= 4\cos\frac{\pi}{15}t \times \left(\frac{\pi}{15}\right) = -0.5$

$t_1 = 10.5536\ldots$

≈ 10.6 sec

$t_2 = 19.4463\ldots$

≈ 19.4

d) $h(19.4) = 4\sin\left[\frac{\pi}{15}(19.4)\right] + 2$

$= -1.186\ldots$

yes, negative → underwater