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Multivariable Calculus 1: Vectors and Derivatives

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3. Waves and derivatives

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Problem Set B due Aug 18, 2021 20:30 IST   Completed

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Problem 3

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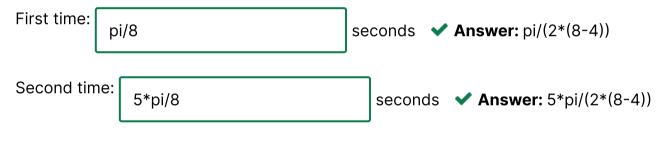
Waves in an ocean move according to the function $f(x, t) = \sin(x - 4t)$. You are on a boat with position $x = 8t$.

Variable	Units
x	meters
t	seconds

Find the first two times $(t > 0)$ where you will be at the maximum of the waves.

First time:

    pi/8   seconds   ✔ **Answer:** pi/(2*(8-4))

Second time:

    5*pi/8   seconds   ✔ **Answer:** 5*pi/(2*(8-4))

   ? INPUT HELP

Solution:

First we plug in $x = 8t$ into $\sin(x - 4t)$. The wave maximums occur when $\sin(8t - 4t) = 1$. The first time this happens is when $(8 - 4)t = \pi/2$. The second time happens when $(8 - 4)t = 5\pi/2$.

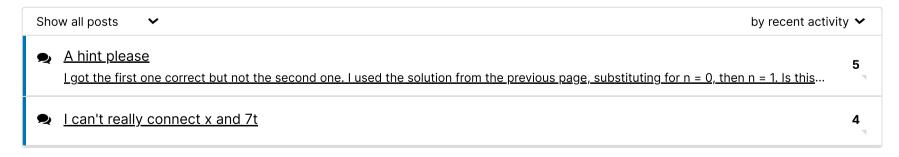[Submit]   You have used 2 of 10 attempts

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  ⓘ Answers are displayed within the problem

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3. Waves and derivatives

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| 💬 **A hint please** | 5 |
| I got the first one correct but not the second one. I used the solution from the previous page, substituting for n = 0, then n = 1. Is this... | |

| 💬 **I can't really connect x and 7t** | 4 |

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