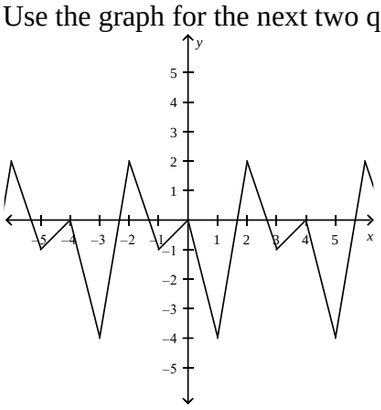
MCR 3U1 Task – Periodic Functions (SINE) Name:

PART A: Multiple Choice – Place your answer on the dash on the left.

Use the graph for the next two questions.



1. The graph of a periodic function is shown above.
   What is the amplitude of the function?

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a. 2 c. 4
b. 3 d. 6

2. What is the period of the above function?

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a. 2 c. 4
b. 3 d. 6

3. If $g(x) = \sin(6x) + 3$, determine $g(15°)$.

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a. $g(15°) = 3.71$ c. $g(15°) = 3$
b. $g(15°) = 3.87$ d. $g(15°) = 4$

4. Determine the amplitude of the function $y = 4\sin x - 7$.

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a. 7 c. 4
b. -7 d. -4

5. A motorcycle race is taking place on a flat surface 3 m above the ground. Suppose one of the bike wheels has a radius of 37 cm and it has a nail stuck in it. What is the maximum height that the nail obtains with respect to the ground?

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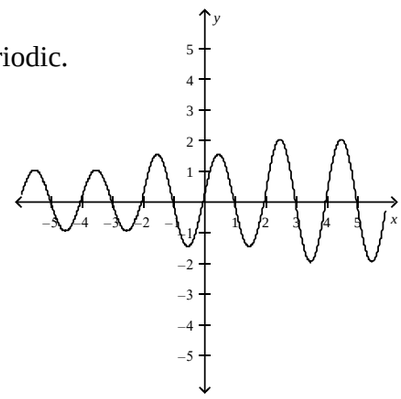
a. 37 cm c. 74 cm
b. 337 cm d. 374 cm

PART B: Communication

1. Explain why the function whose graph is shown to the right is not periodic.



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2. Can a function be sinusoidal but not periodic? Explain.

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PART C: Applications & Problem Solving

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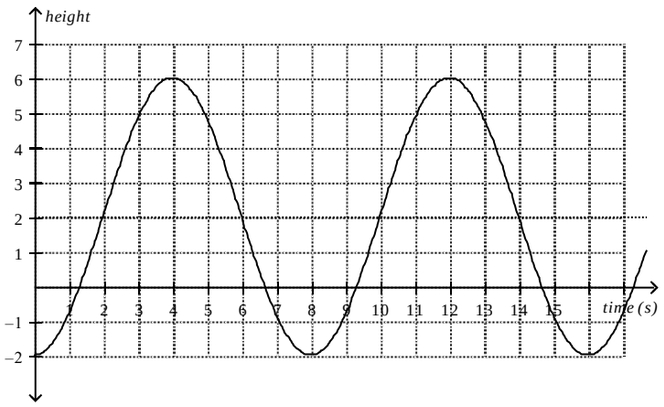
1. A fish is caught in a water wheel.
A graph of its height (m) with respect to the surface of the water over time is below. Water surface is h = 0m



a) What is the diameter of the water wheel?

b) How long does it take the fish to complete one revolution of the wheel?

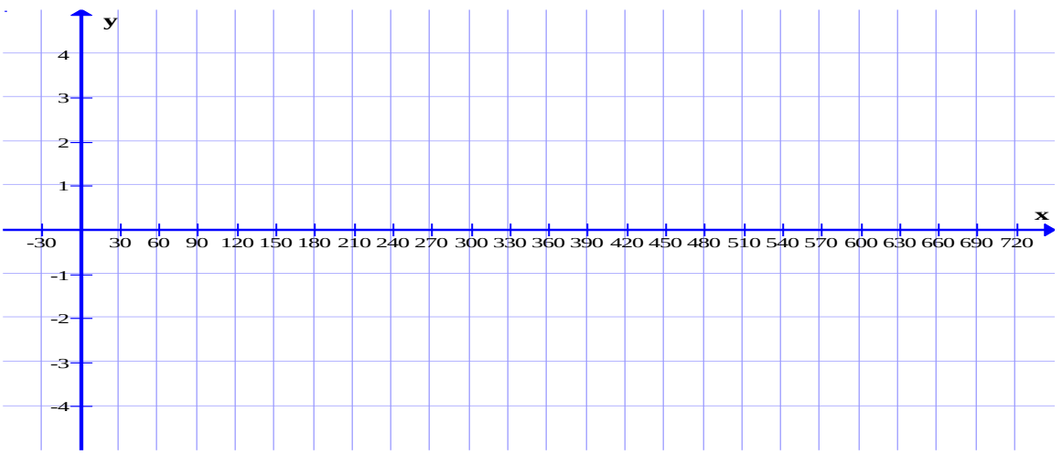
c) Does the fish reenter the water? If so, for approximately how long?

d) What is the equation that models this function?

e) After 36 seconds, at what height will the fish be?

2. Describe the transformations and Sketch the following graphs using the 5 key points

a) $y = 3\sin(2(x - 90^o)) - 1$ (Three cycles)



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b) $y = -2\sin(0.5x + 15°) - 3$ (Two Cycles)