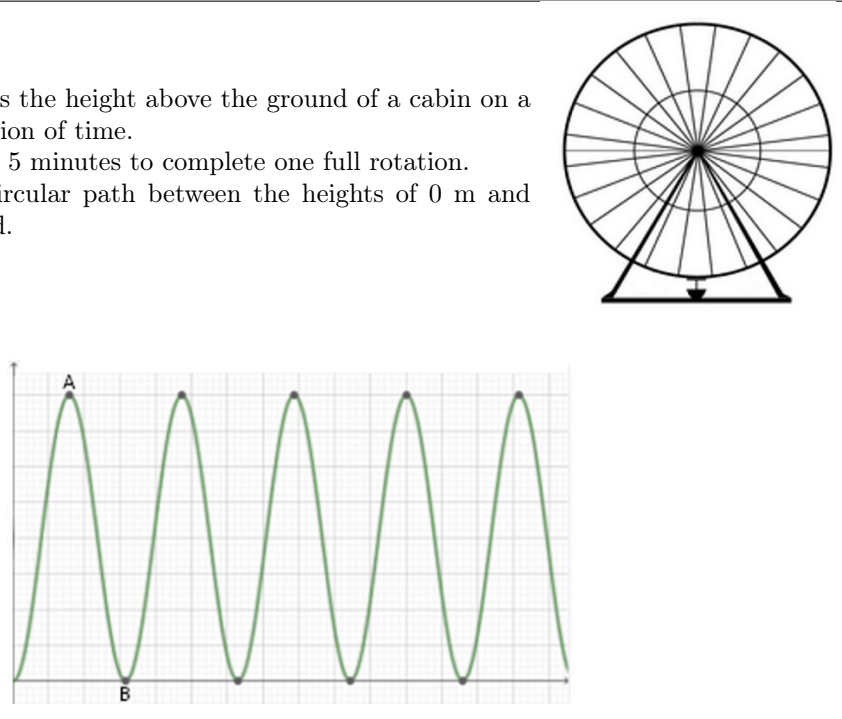


Exercise 1 A tetrahedral dice is labelled with four numbers: 1, 2, 3 and 4. The dice is thrown three times. Let X represent the number of times a 1 is obtained. Determine the probability distribution of the variable X and calculate its expected value.	Calc. : ✖ 6 marks
--	--------------------------------------

Exercise 2 In a family of 4 people (two parents and their two children), each has a smartphone of the same make and model. The probability that this “basic” model will fail during the year is 20%. Calculate the probability that exactly two of the members of this family will have their smartphone fail during the year.	Calc. : ✖ 6 marks
--	--------------------------------------

Exercise 3 <p>The graph below shows the height above the ground of a cabin on a Ferris wheel as a function of time.</p> <p>The Ferris wheel takes 5 minutes to complete one full rotation.</p> <p>The cabin follows a circular path between the heights of 0 m and 65 m above the ground.</p> <div data-bbox="399 582 1244 1299">  </div> <div data-bbox="143 1310 1388 1489"> <ol style="list-style-type: none"> Determine the coordinates of points A and B on the graph above. 2 marks Explain how the graph would change if the Ferris wheel were to take 10 minutes to complete a circuit. 2 marks Describe any limitations of this model when applied to the practical situation. 2 marks </div>	Calc. : ✖
--	-----------

Exercise 4

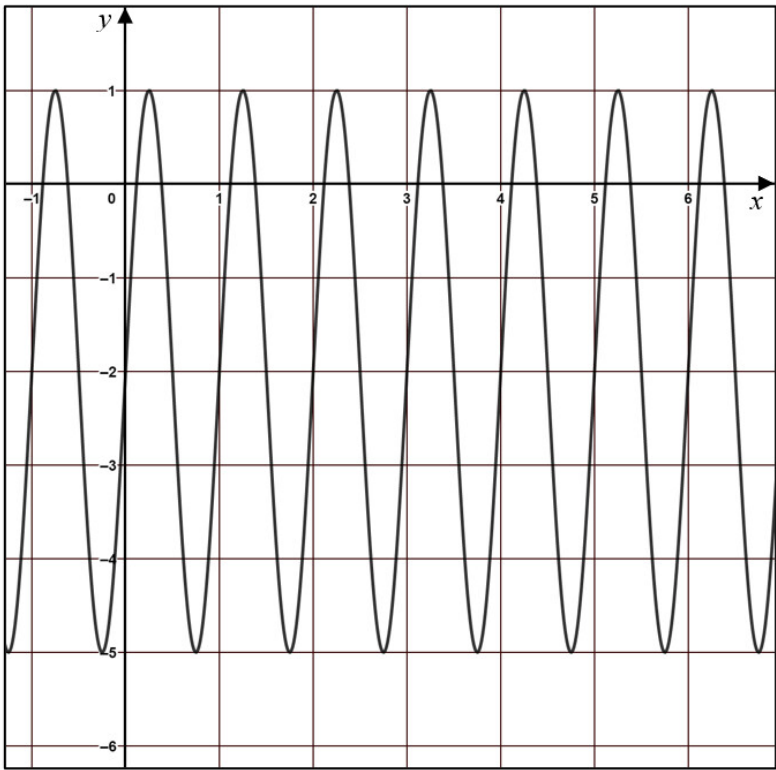
Calc. : ✖

<p>For each of the situations A to E described below, state whether the model involves:</p> <p>1. (a) Growth (b) Decay (c) Neither</p> <p><u>and</u> whether the model is:</p> <p>2. (a) Linear (b) Exponential (c) Quadratic (d) Sinusoidal</p> <p>A: A population of 100 mice increases by 20% each week under favourable conditions</p> <p>B: A tree which is 1.2 m tall when planted grows 30 cm each month during the growing season</p> <p>C: The height, h, of a stone, t seconds after being dropped from the top of a tower is modelled by the function</p> $h(t) = 130 - 5t^2$ <p>D: The number of daylight hours in Blankenloch varies periodically each year between 16 hrs 12 mins and 8 hrs 13 mins</p> <p>E: The temperature, T, of a liquid, t minutes after being placed in a refrigerator, is given by the function</p> $T(t) = 98 \cdot 2^{-\frac{t}{50}}$	10 marks
---	----------

Exercise 5

Calc. : ✖
7 marks

The diagram shows the graphical representation of a sine function, f .



Determine the Amplitude (a), the Period (p), the Horizontal Translation (c) and the mean value (d) of the function f .
Use these values to **deduce** the equation of the function, $f(x)$.