**MODELLING PERIODIC BEHAVIOUR**

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| The largest Ferris Wheel opened in Chaoyang Park, Beijing just in time for the 2008 Olympics. The 682-foot-high wheel, which has its centre 346 feet above the ground, will give up to 3,840 passengers per hour a fantastic view of the city, and surrounding area. Each of the wheel’s 48 capsules holds 40 people.  **Suppose** that you and a group of friends are riding the Ferris wheel. The ride then begins with you at point A. The Ferris wheel turns counter clockwise at a constant speed. The wheel takes 60 seconds to complete one revolution. | ferris.jpeg |

1. Point A is when you get on the wheel. Determine the time and height at point A. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

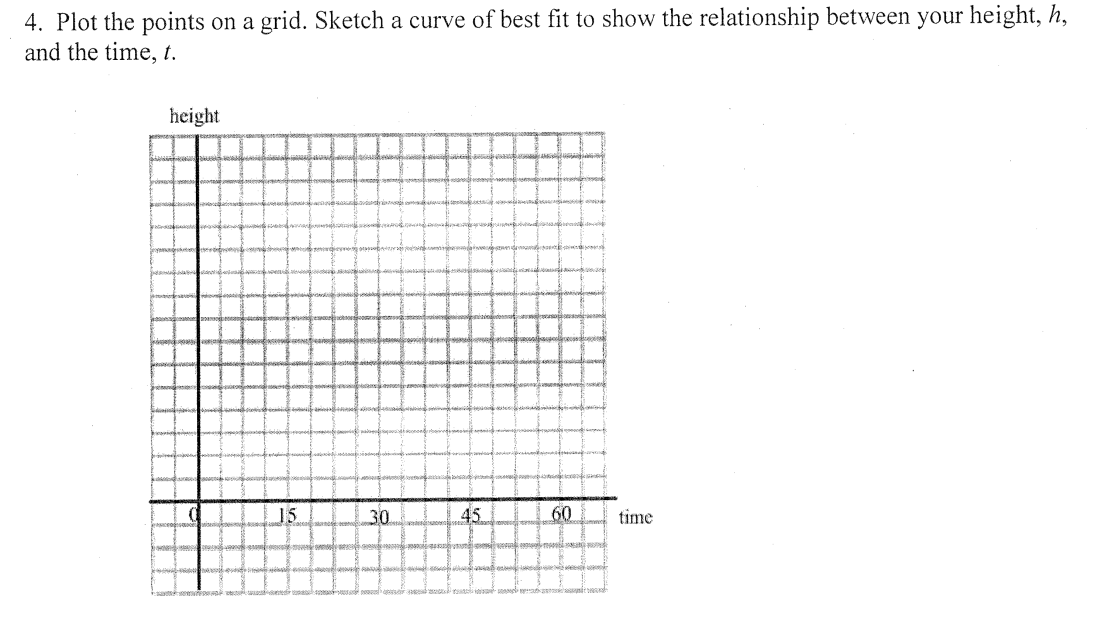
2. Point C is the maximum height you will reach. Determine the time and height at point C. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Point B is half way between A and C. Determine the time and height at point B. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Point D is half way between C and E. Determine the time and height at point D. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

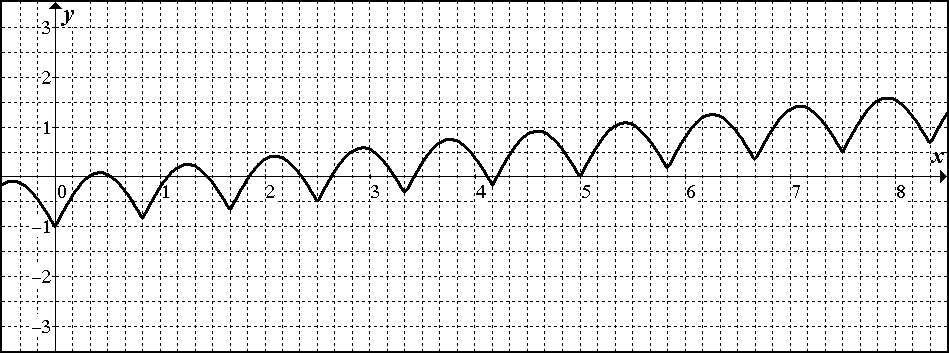
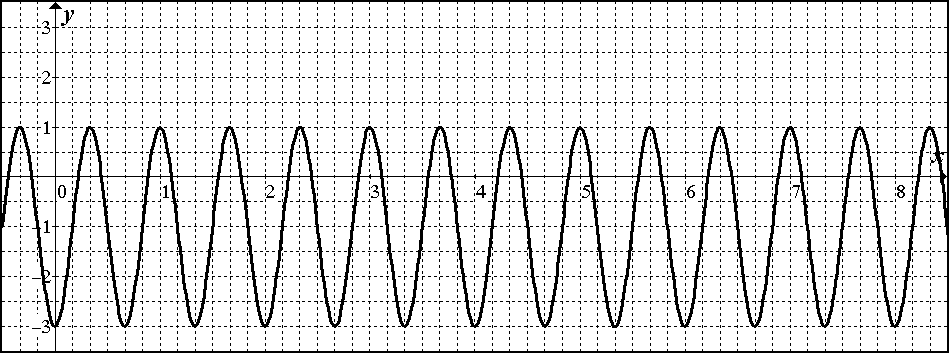
5. Point E is when you complete one revolution. Determine the time and height at point E. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

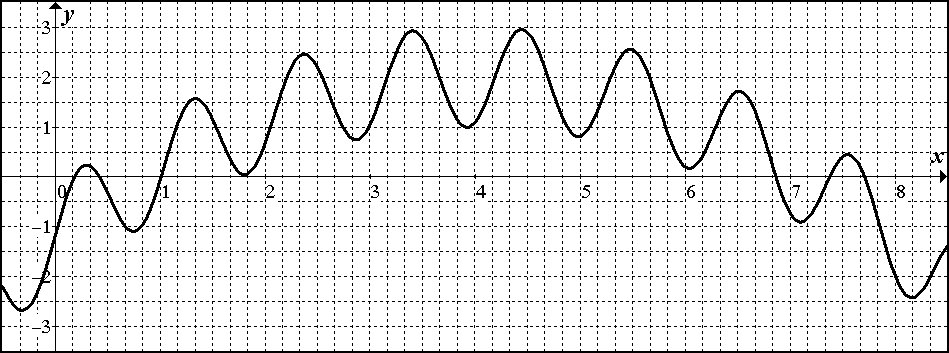
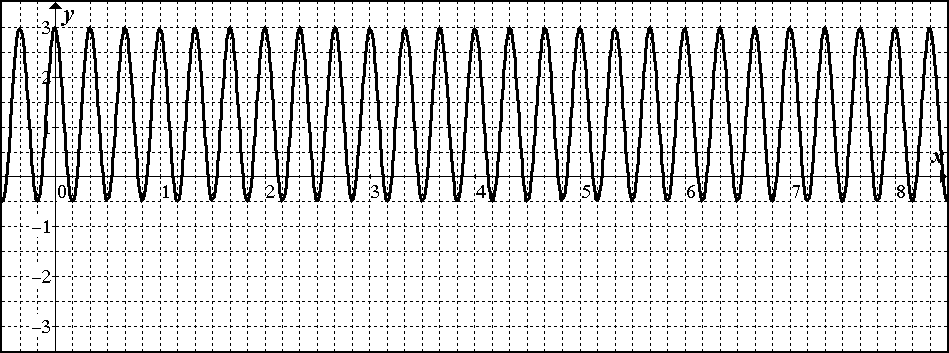
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| B  C  D  A (0, )  E | |  |  | | --- | --- | | **Rotation of Wheel in Seconds** | **Height Relative to the ground in Feet** | | 0 |  | | 15 |  | | 30 |  | | 45 |  | | 60 |  | |

6. Plot the points on a grid. Sketch a curve of best fit to show the relationship between your height, h, and the time, t.

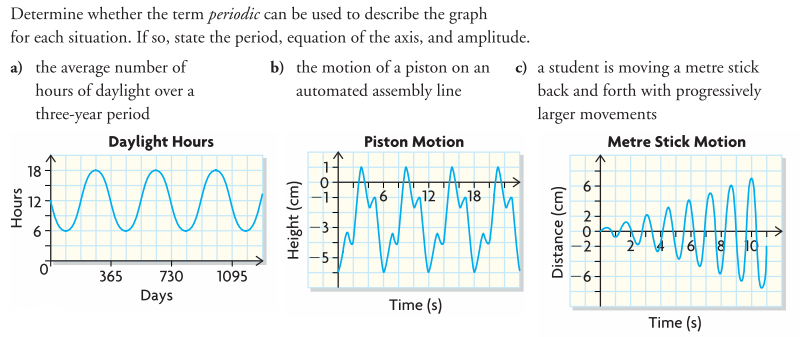
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| **KEY IDEAS**  Max   * A function is ***PERIODIC*** if it has a pattern of *y*-values that repeats at regular intervals. * One complete pattern of a periodic function is called a ***CYCLE***. A cycle may begin at any point on the graph. * The horizontal distance from the beginning of one cycle to the beginning of the next cycle is called the ***period***. * The horizontal line that is halfway between the maximum (peak) and minimum (trough) values of a periodic curve is called the **AXIS OF THE CURVE.**   The equation of the **AXIS OF THE CURVE** is   * The magnitude of the vertical distance from the **AXIS OF THE CURVE** to either the max (peak) or min (trough) value is called the **amplitude** of the function. The amplitude is **always positive.**   The **amplitude,** a, is calculated as  periodic graph.PNG |

**Example 1:** Determine if the function is periodic.





**Example 2:** Determine whether the term *periodic* can be used to describe the graph for each situation. If so, state the **period, max, min, equation of the axis, and amplitude.**

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