**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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| BCDA (0, )E  |

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| **Rotation of Wheelin Seconds** | **Height Relative to the ground in Feet** |
| 0 |  |
| 15 |  |
| 30 |  |
| 45 |  |
| 60 |  |

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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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