**8.2 Exploring Graphs of Periodic Functions**

**By the end of the lesson you will be able to:**

* Examine the characteristics of sine and cosine graphs including x-intercepts, y-intercepts, domain, range, amplitude, period and midline equations.

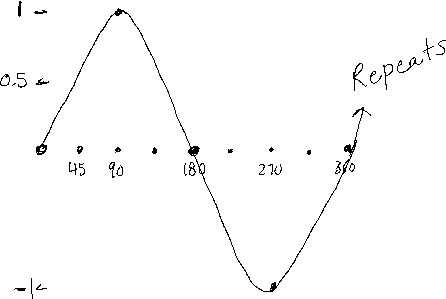
**Periodic functions** are functions whose graph \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ intervals or cycles.



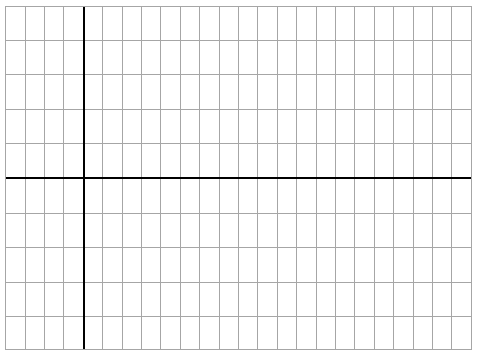
They describe things like riding a Ferris wheel, where the motion oscillates.

The two most common periodic functions are the **sine** **and cosine functions**.

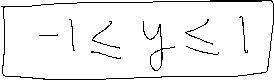
**Example 1 – Graphing the Sine Function**



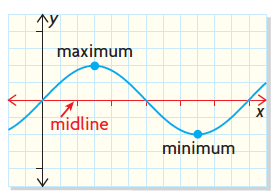
|  |  |  |  |
| --- | --- | --- | --- |
| x | | | y |
| 0° | 0 rad | |  |
| 45° | | |  |
| 90° | rad | |  |
| 135° | | |  |
| 180° | | rad |  |
| 225° | | |  |
| 270° | | rad |  |
| 315° | | |  |
| 360° | | rad |  |
| 405° | | |  |



**Characteristics of the Sine Graph**



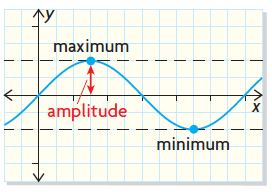
|  |  |
| --- | --- |
| 1. x-intercept(s)  2. y-intercept | 3. Domain  4. Range |





**Midline** is the horizontal line \_\_\_\_\_\_\_\_\_\_\_\_\_\_ between the maximum and minimum values of a periodic function.

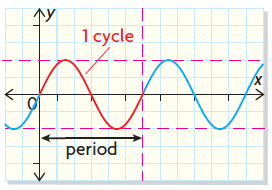






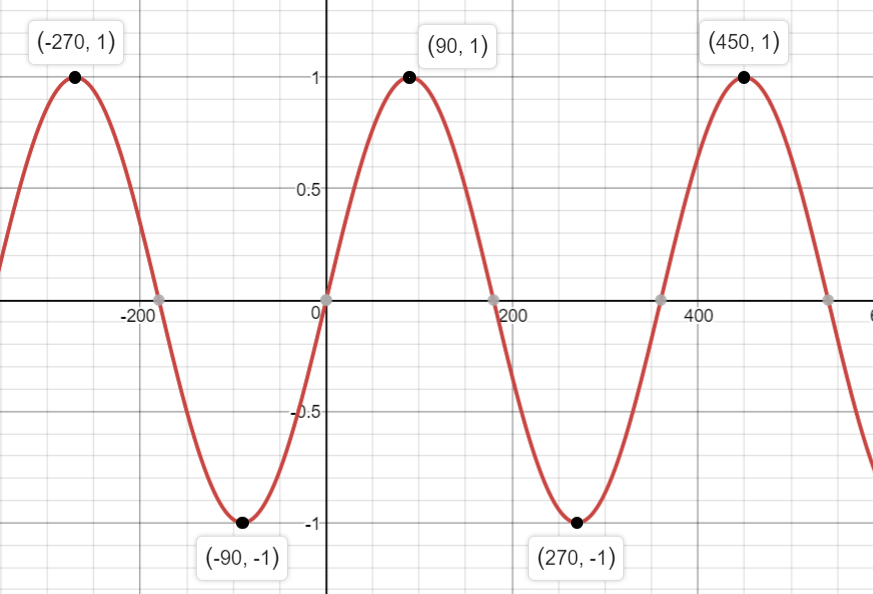
The **amplitude** is the distance from the \_\_\_\_\_\_\_\_\_\_\_ to either the maximum or minimum value of a periodic function; the amplitude is always expressed as a \_\_\_\_\_\_\_\_\_\_ value.





The **period** is the length of the interval of the domain to complete one cycle.

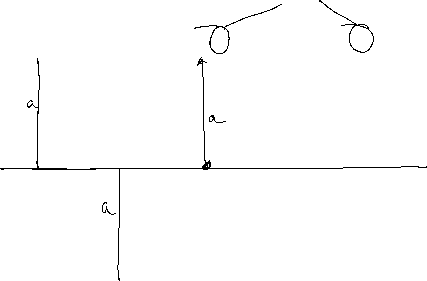


*Back to our sine function…*

5. Midline equation



6. Amplitude

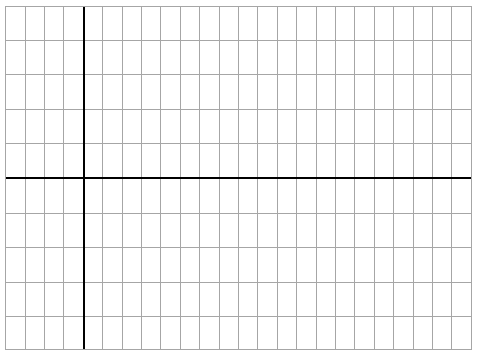


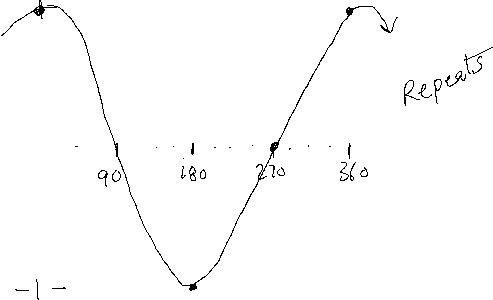
7. Period

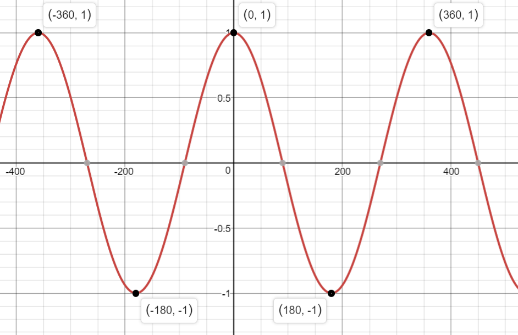


**Example 2 – Graphing the Cosine Function**

|  |  |  |
| --- | --- | --- |
| x |  | y |
| 0° | 0 rad |  |
| 45° |  |  |
| 90° | rad |  |
| 135° |  |  |
| 180° | rad |  |
| 225° |  |  |
| 270° | rad |  |
| 315° |  |  |
| 360° | rad |  |
| 405° |  |  |





**Characteristics of the Cosine Graph**



|  |  |
| --- | --- |
| 1. x-intercept(s)  2. y-intercept  5. Midline equation  7. Period | 3. Domain  4. Range  6. Amplitude |



**Practice**: