

To sketch the graph of a sine or cosine function of the form

$$f(x) = A \sin(bx + c)$$

or

$$f(x) = A \cos(bx + c)$$

The most important points in a single period are the five points: where the graph crosses the x-axis or where the maximum and minimum of the function occur. If you correctly position these five points then the rest of the period is easy to sketch.

- Find the amplitude, period, and phase shift
- The first point has x-coordinate equal to the phase shift. For a sine graph the y-coordinate is 0; for a cosine graph, the y-coordinate is A (note: use the sign of A here!)
- The last point (fifth point) is at the end of the period. Find its x-coordinate by adding the period to the phase shift. Its y-coordinate is the same as the y-coordinate of the first point.
- Now we find the halfway point at the center of the period. Its x-coordinate is the average of the x-coordinates of the first point and the last point. For a sine graph its y-coordinate is 0; for a cosine graph, its y-coordinate is -A.
- Now we find the halfway points to the halfway points. Their x-coordinates are the averages of the two x-values they are halfway between. For a sine graph, the y-coordinates are A and -A; for a cosine graph, the y-coordinates are 0.