

Exercise 14

What do the terms in the series

$$\frac{\pi}{4} = \sin 1 + \frac{1}{3} \sin 3 + \frac{1}{5} \sin 5 + \dots$$

look like? Make a graph of $\sin n$ for $n = 1, 2, 3, 4, \dots, 20$ without drawing the intervening curve; that is, just plot the 20 points. Use a calculator; remember that we are using radians. In some sense the numbers $\sin n$ are *randomly* located in the interval $(-1, 1)$. There is a great deal of “random cancellation” in the series.

Solution

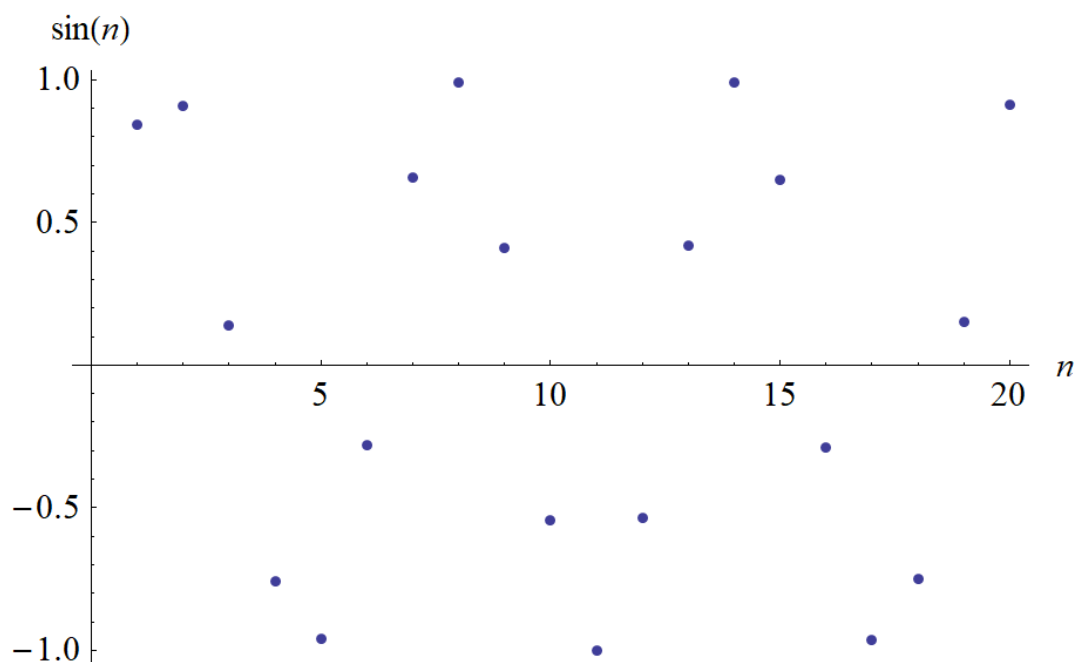


Figure 1: This is a plot of $\sin n$ vs. n for $n = 1, 2, 3, 4, \dots, 20$ without the intervening curve. All the points in the graph do appear to be randomly distributed in the viewing window.