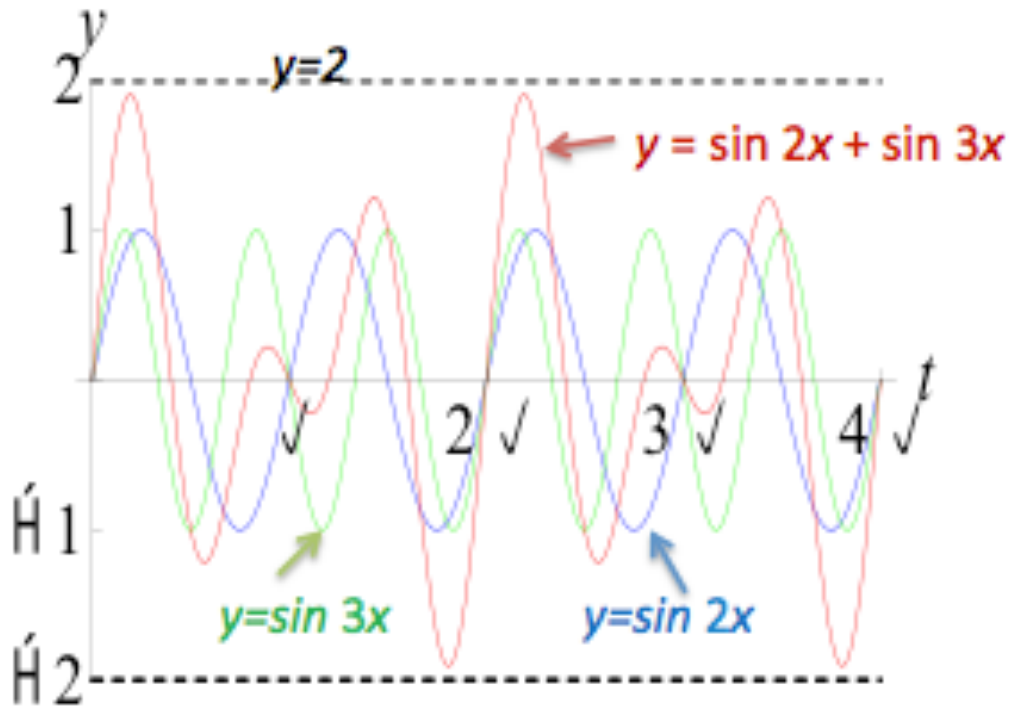# Sec. 9.3 Trigonometric Models

Ex: Sketch and describe the graph of $y = \sin 2x + \sin 3x$.

The figure shows that the function $y = \sin 2x + \sin 3x$ is not sinusoidal. It is, however, periodic. Its period seems to be 2π, since it repeats twice on the interval of length 4π shown in the figure.

Since the period of $\sin 2x$ is π and the period of $\sin 3x$ is $2\pi/3$, on any interval of length 2π, $y = \sin 2x$ completes two cycles and $y = \sin 3x$ completes three cycles. Both are at the beginning of a new cycle after an interval of 2π, so their sum begins to repeat at this point. Even though the maximum value of each is 1, the maximum value of their sum is not 2; it is a little less than 2, because they achieve their maximum values for different x values.