Problem 2

In each of Problems 1 through 4, write the given expression as a product of two trigonometric functions of different frequencies.

\[ \sin 7t - \sin 6t \]

Solution

Recall the sum-to-product formula,

\[ \sin u - \sin v = 2 \cos \left( \frac{u + v}{2} \right) \sin \left( \frac{u - v}{2} \right). \]

Using this, the given expression becomes

\[
\sin 7t - \sin 6t = 2 \cos \left( \frac{7t + 6t}{2} \right) \sin \left( \frac{7t - 6t}{2} \right) \\
= 2 \cos \frac{13t}{2} \sin \frac{t}{2}.
\]