

Verify by substitution that the given function is a solution of the given differential equation.

$$y'' + y = 3 \cos(2x)$$

stated

$$y_1 = \cos x - \cos(2x)$$

$$y_2 = \sin x - \cos(2x)$$

$$y_1' = -\sin x + 2 \sin(2x)$$

$$y_1'' = -\cos x + 4 \cos(2x)$$

$$y_2' = \cos x + 2 \sin(2x)$$

$$y_2'' = -\sin x + 4 \cos(2x)$$

compute Derivatives



$$-\cos x + 4 \cos(2x) + \cos x - \cos 2x = 3 \cos(2x)$$

$$-\sin x + 4 \cos(2x) + \sin x - \cos(2x) = 3 \cos(2x)$$

Plug Into Equation



Thus  $y_1, y_2$  are solutions to the given differential equation.