Problem 7

In each of Problems 7 through 14, verify that each given function is a solution of the differential equation.

$$y'' - y = 0; \qquad y_1(t) = e^t, \quad y_2(t) = \cosh t$$

Solution

Check to see that y_1 and y_2 satisfy the given differential equation.

$$\begin{aligned} y_1'' - y_1 &\stackrel{?}{=} 0 \\ \frac{d^2}{dt^2}(e^t) - e^t &\stackrel{?}{=} 0 \\ e^t - e^t &\stackrel{?}{=} 0 \\ 0 &= 0 \end{aligned}$$

The first solution is verified.

$$\begin{aligned} y_2'' - y_2 &\stackrel{?}{=} 0 \\ \frac{d^2}{dt^2}(\cosh t) - \cosh t &\stackrel{?}{=} 0 \\ \cosh t - \cosh t &\stackrel{?}{=} 0 \\ 0 &= 0 \end{aligned}$$

The second solution is verified.