15.38

lördag 24 december 2022 14:17

a) $r^2 - 4 = 0 \qquad r = 0 \pm \sqrt{4} \qquad r_1 = 2 \qquad r_2 = 2$

$$y = C_1 e^{2x} + C_2 e^{-2x}$$

$$y' = 2C_1 e^{2x} - 2C_2 e^{-2x}$$

$$y(0) = C_1 + C_2 = 0$$

$$y'(0) = 2(C_1 - C_2) = 1$$

$C_1 + C_2 = 0 \qquad 2C_1 = 1/2 \qquad C_1 = 1/4 \qquad C_2 = -1/4$

$C_1 - C_2 = 1/2$

Sv: $y = 1/4 \left(e^{2x} - e^{-2x} \right)$

b) $r^2 + 6r + 9 = 0 \qquad y(0) = -1 \qquad y'(0) = 1$

$r = -3 \pm \sqrt{9-9} \qquad r_1 = r_2 = -3$

$$y = (C_1 x + C_2) e^{-3x}$$

$$y' = C_1 e^{-3x} - 3(C_1 x + C_2) e^{-3x}$$

$y(0) = C_2 = -1$

$y'(0) = C_1 - 3(-1) = 1 \qquad C_1 = -2$

Sv: $y = -(2x + 1) e^{-3x}$