Test #3 Solutions

Ethan Lo
MAT 2680

(a) Find general solution of

$$y'' + 64y = 0.$$

assoc. polynomial: $r^2 + 64 = 0$

$$r = \pm\sqrt{-64}$$

$$r = \pm 8\sqrt{-1}$$

$$r = \pm 8i \quad \text{(case 3)}$$

$$\boxed{y = c_1 e^{0x}\sin(8x) + c_2 e^{0x}\cos(8x)}$$

(b) Find particular solution

$$y(0) = 3 \qquad y'(0) = -48$$

$y(0)=3 \Rightarrow$ $3 = c_1\sin(0) + c_2\cos(0)$

$$\boxed{3 = c_2}$$

$$y' = 8c_1\cos(8x) - 8c_2\sin(8x)$$

$y'(0) = -48 \Rightarrow$ $-48 = 8c_1\cos(0) - 8c_2\sin(0)$

$$-48 = 8c_1 - 0$$

$$c_1 = -6$$

$$\boxed{y = -6\sin(8x) + 3\cos(8x)}$$