

## Second Order Repeat

$$8. 4y'' + 32y' + 64y = 0$$

$$4r^2 + 32r + 64 = 0$$

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$$(2r+8)(2r+8) = 0$$

$$r = -4, -4$$

$$y = Ae^{-4t} + Bte^{-4t}$$

$$y(0) = -7, y'(0) = 31$$

$$y(t) = C_1 e^{-4t} + C_2 t e^{-4t}$$

$$-7 = C_1 e^{-4(0)} + C_2 \cdot 0 e^{-4(0)}$$

$$-7 = C_1$$

$$y' = -4C_1 e^{-4t} + C_2 (e^{-4t} - 4te^{-4t})$$

$$31 = -4(-7) + C_2 (1 - 0)$$

$$3 = C_2$$

$$y = -7e^{-4t} + 3te^{-4t}$$