Contents

1   Section 5.3

1.1   5.3.1

Find the general solution of the differential equation.

$$y'' - 289y = 0$$

$$r^2 - 289 = 0$$
$$r = 17, -17$$
$$y(x) = c_1 e^{17x} + c_2 e^{-17x}$$

1.2   5.3.3

Find the general solution of the differential equation.

$$y'' + y' - 56y = 0$$

$$r^2 + r - 56 = 0$$
$$r = 7, -8$$
$$y(t) = c_1 e^{7t} + c_2 e^{-8t}$$

1.3   5.3.4

Find a general solution.
$$4y'' + 7y' - 2y = 0$$

$$4r^2 + 7r - 2 = 0$$
$$r = \frac{1}{4}, -2$$
$$y(t) = c_1 e^{t/4} + c_2 e^{-2t}$$

1.4 5.3.5

Find a general solution to the given differential equation.

$$4w'' + 12w' + 9w = 0$$

$$4r^2 + 12r + 9 = 0$$
$$r = -\frac{3}{2}$$
$$w(t) = c_1 e^{-3t/2} + c_2 t e^{-3t/2}$$

1.5 5.3.7

Find the general solution of the differential equation.

$$36y'' - 84y' + 49y = 0$$

$$36r^2 - 84r + 49 = 0$$
$$r = \frac{7}{6}$$
$$y(x) = c_1 e^{7x/6} + x c_2 e^{7x/6}$$

1.6 5.3.9

The auxiliary equation for the given differential equation has complex roots. Find a general solution.

$$y'' - 10y' + 29y = 0$$

$$r^2 - 10r + 29 = 0$$
$$r = 5 \pm 2i$$
$$y(t) = c_1 e^{5t} \cos(2t) + c_2 e^{5t} \sin(2t)$$

1.7 5.3.11

Find the general solution of the differential equation.

$$y^{(4)} - 32y^{(3)} + 256y'' = 0$$

$$r^4 - 32r^3 + 256r^2 = 0$$
$$r = 0, 0, 16, 16$$
$$y(x) = c_1 + c_2 x + c_3 e^{16x} + c_4 x e^{16x}$$

1.8   5.3.13

Find the general solution of the differential equation.

$$9y^{(3)} + 12y'' + 4y' = 0$$

$$9r^3 + 12r^2 + 4r = 0$$
$$r = 0, -\frac{2}{3}, -\frac{2}{3}$$
$$y(x) = c_1 + c_2 e^{-2x/3} + c_3 x e^{-2x/3}$$

1.9   5.3.18

$$81y^{(4)} = y$$