



SECTIONS 3.1 – 3.4

When solving the ODE

$$ax'' + bx' + cx = 0,$$

find the roots to the characteristic polynomial $ar^2 + br + c$. There are three cases:

Roots are real and distinct:

Roots are complex conjugates:

Roots are real and repeated:

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

Find the solution to $x'' - x' - 2x = 0$, $x(0) = 1$, $x'(0) = 1$.

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

Find the solution to $x'' + 4x' + 3x = 0$, $x(0) = 2$, $x'(0) = -1$.

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

Find the solution to $6x'' - 5x' + x = 0, x(0) = 4, x'(0) = 0$.

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

Solve the IVP $y'' - 2y' + 2y = 0$, $y(0) = 1$, $y'(0) = 0$.

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

Solve the IVP $y'' - 2y' + 6y = 0$, $y(0) = 0$, $y'(0) = 1$.

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

Solve the IVP $y'' + 2y' + 2y = 0$, $y(0) = 1$, $y'(0) = 2$.

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

Solve the IVP $y'' - 2y' + y = 0$, $y(0) = 1$, $y'(0) = 0$.

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

Solve the IVP $y'' - 2y' + 10y = 0$, $y(0) = 2$, $y'(0) = 0$.

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

Solve the IVP $x'' - 5x' + 6x = 2e^t$, $x(0) = 1$, $x'(0) = 0$.

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

Solve the IVP $x'' + 2x' + x = 3e^{-t}$, $x(0) = 1$, $x'(0) = 1$.

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4

Solve the IVP $x'' + 2x' + x = \cos(2t)$, $x(0) = 1$, $x'(0) = 1$.

SECTIONS 3.1 – 3.4

SECTIONS 3.1 – 3.4