QUIZ #1

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Q7. $y''' = e^x$, $y = e^x + ax^2 + bx + c$

Solution:

$$y = e^x + ax^2 + bx + c$$
$$y' = e^x + 2ax + b$$
$$y'' = e^x + 2a$$
$$y''' = e^x$$

Order = 3.

Hence the given function is a solution of ODE.

(Q8) $y'' + 2y' + 2y = 0$, $y = e^{-x}(a\cos x + b\sin x)$

Solution:

$$y = e^{-x}(a\cos x + b\sin x)$$
$$y' = e^{-x}(-a\sin x + b\cos x) - e^{-x}(a\cos x + b\sin x)$$
$$y' = e^{-x}[(b-a)\cos x - (b+a)\sin x]$$
$$y'' = e^{-x}[(a-b)\sin x - (a+b)\cos x] - e^{-x}[(b-a)\cos x - (a+b)\sin x]$$
$$= e^{-x}(-2b\cos x + 2a\sin x)$$

Putting the values of y'', y' and y in $y'' + 2y' + 2y$

$$e^{-x}[-2b\cos x + 2a\sin x + 2(b-a)\cos x - 2(a+b)\sin x + 2a\cos x + 2b\sin x]$$
$$= e^{-x}[(-2b + 2b - 2a + 2a)\cos x + (2a - 2b - 2a + 2b)\sin x]$$
$$= 0$$

Order = 2

Hence the given function is a solution to ODE.