\#8:  
$8z'(x) - 2z(x) = 3x^{100} e^{4x} \cos 25x$
Method applies. You would have \(202\) undet'd coeffs! 
\( (A_{100} x^{100} + A_{99} x^{99} + \ldots + A_0) e^{4x} \cos 25x + \)  
\( + (B_{100} x^{100} + B_{99} x^{99} + \ldots + B_0) e^{4x} \sin 25x \) 
(Recognize that \(4 \pm 25i\) is not a root of the char. eqn.)

\#10:  
undet' coeffs: \(y = A\) (a constant); plugging in produces \(A = -10\)
So \(y = \overline{-10}\) is a sol'n
(If you found this difficult, it's because it was "too" easy!)

\#11:  
\(2z'' + z = 8 e^{2t}\)  
Try \(z = A e^{2t}\)  
\(z'' = 4A e^{2t}\) (\(2\) is not a root of the char. eqn)
\((8A + A) = 8 e^{2t}\) so \(A = 1\)
\(z = e^{2t}\)

\#13:  
\(y'' - y' + 9y = 3 \sin 3t\)
\(y = A e^{3t} \cos 3t + B e^{3t} \sin 3t\) (\(\pm 3i\) is not a root of the char. eqn)
\(y' = -3A e^{3t} \sin 3t + 3B e^{3t} \cos 3t\)
\(y'' = -9A e^{3t} \cos 3t - 9B e^{3t} \sin 3t\)
\((-9A + 3B + 9A) \cos 3t + (-9B - 3A + 9B) \sin 3t = 3 \sin 3t\)
\(3B = 0\)
\(-3A = 3\)  
\(y = -e^{3t}\)

\#16:  
\(\theta''(t) - \theta(t) = t \sin t\) (\(ti\) is not a root of the char. eqn)
\(\theta(t) = (At + B) \cos t + (Ct + D) \sin t\)