Solve the following DE equations

1. \( \frac{d^2y}{dx^2} + \frac{dy}{dx} - 2y = 0 \)

2. \( \frac{d^2x}{dt^2} + t = \sec t \)

3. \( 4 \frac{d^3y}{dx^3} - 3 \frac{dy}{dx} + y = 0 \)

4. \( x^2 \frac{d^2y}{dx^2} - 2xy' + 2y = 8 + x \)
5. \( \frac{d^2 y}{dx^2} - y = 1 \)

6. Discuss the linearity of the roots 1, \( \sin x \), \( \cos x \).

Short answer.

7. The general solution is the linear combination of the_________ solution and the __________ solution.

8. A differential equation of order 4 has __________ constants in the general solution.

9. The primary difference between a particular solution and a complementary solution is ____________.

10. The ____________ method of solving higher order differential equations whose DE does not have constant coefficients.