Bryan Guner 10/6

Reduction of Order by roots

- Homogeneous Linear equations with Constant coeficients:
  → General Solution of $ay'' + by' + cy = 0$ is found by Solving Equation "$am^2 + bm + c = 0$" for roots m_1 & m_2

- Case 1: $b^2 > 4ac$, m_1 & m_2 are real & distinct
  $y = c_1 e^{m_1 x} + c_2 e^{m_2 x}$
- Case 2: $b^2 = 4ac$, m_1 & m_2 are real & equal
  $y = c_1 e^{m_1 x} + c_2 e^{m_1 x}$
- Case 3: $b^2 < 4ac$, m_1 & m_2 are Conjugate Complex numbers
  $y = e^{\alpha x}(C_1 \cdot \cos(\beta x) + C_2 \cdot \sin(\beta x))$

- given $ay'' + by' + cy = 0$ we get $am^2 + bm + c = 0$
  $m_1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$ $m_2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$

end