

THE QUARTIC FORMULA – EXAMPLES

Example 1:

$$x^4 - 4x^3 - 35x^2 + 78x + 360 = 0$$

$$p = -4, \quad q = -35, \quad r = 78, \quad s = 360.$$

$$d = -41, \quad e = 0, \quad f = 400 \quad (\text{Case 1}).$$

$$y^4 - 41y^2 + 400 = 0 \Rightarrow \quad \text{via the Quadratic Formula that}$$

$$y^2 = 25, \quad y^2 = 16 \quad \text{or}$$

$$y = \pm 5, \quad y = \pm 4.$$

$$x = 6, \quad x = -4, \quad x = 5, \quad x = -3.$$

Example 2:

$$x^4 - 2x^3 - 30x^2 + 166x - 455 = 0$$

$$p = -2, \quad q = -30, \quad r = 166, \quad s = -455.$$

$$d = -31.5, \quad e = 135, \quad f = -379.6875 \quad (\text{Case 2}).$$

$$D = -124.875, \quad E = 30,754.6875, \quad F = -24.75.$$

$$G = 3.696152423.$$

$$A = 1.5, \quad B = 3, \quad C = 6i.$$

$$x = 2 + 3i, \quad x = 2 - 3i, \quad x = -7, \quad x = 5.$$

Example 3:

$$x^4 + 3x^3 - 45x^2 - 59x + 420 = 0$$

$$p = 3, \quad q = -45, \quad r = -59, \quad s = 420.$$

$$d = -48.375, \quad e = 11.875, \quad f = 437.9882813 \quad (\text{Case 2}).$$

$$D = 377, \quad E = -4651.171875, \quad F = 52.75.$$

$$G = 7.25 + 0.4330127019i.$$

$$A = 4.75, \quad B = i, \quad C = 1.5i.$$

$$x = 3, \quad x = 5, \quad x = -7, \quad x = -4.$$