

Example 2: Solving quartic trinomials ($ax^4 + bx^2 + c$)

$$f(x) = x^4 + x^2 - 20$$

Let $A = x^2$

$$f(x) = A^2 + A - 20$$

$$a=1 \quad b=1 \quad c=-20$$

$$\begin{array}{r} -20 \\ -4 \quad 5 \\ 1 \end{array}$$

$$(A-4)(A+5)$$

Since $A = x^2$

$$(x^2-4)(x^2+5)$$

$$x^2-4$$

$$a=1 \quad b=0 \quad c=-4$$

$$\begin{array}{r} -4 \\ 2 \quad -2 \\ 0 \end{array}$$

$$(x+2)(x-2)$$

Factored Form: $f(x) = (x+2)^0 (x-2)^0 (x^2+5)^0$

Roots (Solutions): $x = -2 \quad x = 2 \quad x = i\sqrt{5} \quad x = -i\sqrt{5}$

$$x^2 + 5 = 0$$

$$\sqrt{x^2} = \sqrt{-5} \quad x = \pm i\sqrt{5}$$

$$x = \pm \sqrt{5} i$$