

$$3\left(x^2 - \frac{2}{3}\right) = 4 \quad \text{expand} \quad (1)$$

$$3x^2 - 2 = 4 \quad +2 \quad (2)$$

$$3x^2 = 6 \quad \div 3 \quad (3)$$

isolate the term with the variable

$$x^2 = 2 \quad \sqrt{\dots} \quad (4)$$

$$\sqrt{x^2} = \sqrt{2} \quad \sqrt{x} = |x| \quad (5)$$

$$|x| = \sqrt{2} \quad \text{so that} \quad (6)$$

$$x = \pm\sqrt{2} \quad (7)$$

This example is from MathMode.pdf of Herbert Voß

$$y = 2x^2 - 3x + 5$$

$$= 2 \left( \underbrace{x^2 - \frac{3}{2}x + \left(\frac{3}{4}\right)^2}_{=0} - \left(\frac{3}{4}\right)^2 + \frac{5}{2} \right)$$

$2x^2 - 3x$  is the beginning of an algebraic identity (binomial formula)

$$= 2 \left( \left(x - \frac{3}{4}\right)^2 + \frac{31}{16} \right)$$

$$(a - b)^2 = a^2 - 2ab + b^2$$

$$y = 2 \left( x - \frac{3}{4} \right)^2 + \frac{31}{8}$$

after simplification, the result is