



Completing the Square

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$$x^2 + 4x + 9 =$$

$$x^2 + 2 * 2x + 2^2 - 2^2 + 9 =$$

$$(x + 2)^2 - 4 + 9 =$$

$$(x + 2)^2 + 5.$$

this yields the square and its trailing constant

$$3x^2 - 9x - 10 =$$

$$3 * \left(x^2 - 3x - \frac{10}{3} \right) =$$

$$3 * \left(x^2 - 3x - \frac{10}{3} \right) =$$

$$3 * \left(x^2 - 2 * \frac{3}{2} * x + \left(\frac{3}{2} \right)^2 - \left(\frac{3}{2} \right)^2 - \frac{10}{3} \right) =$$

$$3 * \left(\left(x - \frac{3}{2} \right)^2 - \left(\frac{3}{2} \right)^2 - \frac{10}{3} \right) =$$

$$3 * \left(\left(x - \frac{3}{2} \right)^2 - \frac{9}{4} - \frac{10}{3} \right) =$$

$$3 * \left(\left(x - \frac{3}{2} \right)^2 - \frac{9 * 3 + 4 * 10}{4 * 3} \right) =$$

$$3 * \left(\left(x - \frac{3}{2} \right)^2 - \frac{67}{12} \right).$$

this yields the square and its trailing constant



Completing the Square

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$$x^2 - 7x + 5 =$$

$$x^2 - 2 * \frac{7}{2} * x + 5 =$$

$$x^2 - 2 * \frac{7}{2} * x + \left(\frac{7}{2}\right)^2 - \left(\frac{7}{2}\right)^2 + 5 =$$

$$\left(x - \frac{7}{2}\right)^2 - \frac{49}{4} + 5 * \frac{4}{4} =$$

$$\left(x - \frac{7}{2}\right)^2 - \frac{29}{4}$$

this yields the square and its trailing constant

$$x^2 + 8x - 11 =$$

$$x^2 + 2 * 4x + 4^2 - 4^2 - 11 =$$

$$(x + 4)^2 - 16 - 11 =$$

$$(x + 4)^2 - 27.$$

this yields the square and its trailing constant