

平方完成のやり方

《平方完成の手順》

$$\begin{aligned} y &= 2x^2 + 4x + 3 \\ &\quad \downarrow x^2 \text{ の係数でくくる} \\ &= 2(x^2 + 2x) + 3 \\ &\quad \downarrow \text{半分にする} \\ &= 2\{(x + 1)^2 - 1\} + 3 \\ &\quad \downarrow \text{2乗をひく} \\ &\quad \downarrow \text{分配法則で中かっこをはずす} \\ &= 2(x + 1)^2 - 2 + 3 \\ &= 2(x + 1)^2 + 1 \end{aligned}$$

完成！！

平方完成しなさい。

$$\begin{aligned} y &= x^2 + 2x + 4 \\ &= (x + 1)^2 - 1 + 4 \\ &= (x + 1)^2 + 3 \end{aligned}$$

$$\begin{aligned} y &= 2x^2 - 8x + 1 \\ &= 2(x^2 - 4x) + 1 \\ &= 2\{(x - 2)^2 - 4\} + 1 \\ &= 2(x - 2)^2 - 8 + 1 \\ &= 2(x - 2)^2 - 7 \end{aligned}$$

平方完成しなさい。

$$\begin{aligned}y &= -3x^2 - 6x + 3 \\&= -3(x^2 + 2x) + 3 \\&= -3\{(x+1)^2 - 1\} + 3 \\&= -3(x+1)^2 + 3 + 3 \\&= \underline{-3(x+1)^2 + 6}\end{aligned}$$

$$\begin{aligned}y &= \frac{1}{2}x^2 - x + 3 \\&= \frac{1}{2}x^2 - \frac{2}{2}x + 3 \\&= \frac{1}{2}(x^2 - 2x) + 3 \\&= \frac{1}{2}\{(x-1)^2 - 1\} + 3 \\&= \frac{1}{2}(x-1)^2 - \frac{1}{2} + 3 \\&= \frac{1}{2}(x-1)^2 - \frac{1}{2} + \frac{6}{2} \\&= \underline{\frac{1}{2}(x-1)^2 + \frac{5}{2}}\end{aligned}$$

$$\begin{aligned}y &= 2x^2 + 6x - 1 \\&= 2(x^2 + 3x) - 1 \\&= 2\left\{\left(x + \frac{3}{2}\right)^2 - \frac{9}{4}\right\} - 1 \\&= 2\left(x + \frac{3}{2}\right)^2 - \frac{9}{2} - 1 \\&= 2\left(x + \frac{3}{2}\right)^2 - \frac{9}{2} - \frac{2}{2} \\&= \underline{2\left(x + \frac{3}{2}\right)^2 - \frac{11}{2}}\end{aligned}$$