

# §1 整式の計算

・パスカルの三角形

お25u

$$(x+y)^2 = x^2 + 2xy + y^2$$

$$(x+y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$$

$$(x+y)^4 = x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + y^4$$

$$\begin{array}{r} x^3 + 3x^2y + 3xy^2 + y^3 \\ \times x + y \\ \hline x^4 + 3x^3y + 3x^2y^2 + xy^3 \\ + x^3y + 3x^2y^2 + 3xy^3 + y^4 \\ \hline x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + y^4 \end{array}$$

係数だけ

$$\begin{array}{r} \times \quad 1 \quad 1 \\ \hline 1 \quad 3 \quad 3 \quad 1 \\ 1 \quad 3 \quad 3 \quad 1 \\ \hline 1 \quad 4 \quad 6 \quad 4 \quad 1 \end{array}$$

ズラして足す

$(x+y)^n$  の各項の係数だけ並べると

$$\begin{array}{ccccccc} & & 1 & & 1 & & \\ & \swarrow & & \searrow & & \swarrow & \searrow \\ (x+y)^1 & & 1 & & 2 & & 1 \\ & \swarrow & & \searrow & & \swarrow & \searrow \\ (x+y)^2 & & 1 & & 3 & & 3 & & 1 \\ & \swarrow & & \searrow & & \swarrow & \searrow & & \swarrow & \searrow \\ (x+y)^3 & & 1 & & 4 & & 6 & & 4 & & 1 \\ & \swarrow & & \searrow & & \swarrow & \searrow & & \swarrow & \searrow & \\ (x+y)^4 & & 1 & & 5 & & 10 & & 10 & & 5 & & 1 \\ & \swarrow & & \searrow & & \swarrow & \searrow & & \swarrow & \searrow & & \swarrow & \searrow \\ (x+y)^5 & & 1 & & 6 & & 15 & & 20 & & 15 & & 6 & & 1 \\ & \swarrow & & \searrow & & \swarrow & \searrow & & \swarrow & \searrow & & \swarrow & \searrow & & \swarrow & \searrow \\ \vdots & & 1 & & 7 & & 21 & & 35 & & 35 & & 21 & & 7 & & 1 \end{array}$$

パスカルの三角形