

mathsbdp.fr p21_13_correction

$$\begin{array}{cccccc} 1 & & & & & \\ 1 & 1 & & & & \\ 1 & 2 & 1 & & & \\ 1 & 3 & 3 & 1 & & \\ 1 & 4 & 6 & 4 & 1 & \\ 1 & 5 & 10 & 10 & 5 & 1 \end{array}$$

$$\begin{array}{c} (1-i)^5 \\ \hline -4+4i \end{array}$$

$$\begin{aligned} (1-i)^5 &= (1+(-i))^5 \\ &= 1^5 + 5 \times 1^4 \times (-i)^1 + 10 \times 1^3 \times (-i)^2 + 10 \times 1^2 \times (-i)^3 + 5 \times 1 \times (-i)^4 + (-i)^5 \\ &= 1 - 5i - 10 + 10i + 5 - i \\ &= -4 + 4i \end{aligned}$$

14p21

$$\begin{aligned} z &= (a-i)^3 = a^3 + 3 \times a^2 \times (-i) + 3 \times a \times (-i)^2 \times (-i)^3 \\ &= a^3 - 3a^2i - 3a + i \\ &= a^3 - 3a + i(1 - 3a^2) \end{aligned}$$

$$\begin{aligned} z \text{ réel} &\Leftrightarrow \operatorname{Im}(z) = 0 \\ &\Leftrightarrow 1 - 3a^2 = 0 \end{aligned}$$

$$\Leftrightarrow 3a^2 = 1$$

$$\Leftrightarrow a^2 = \frac{1}{3}$$

$$\Leftrightarrow a = -\sqrt{\frac{1}{3}} = -\frac{\sqrt{3}}{3} \text{ ou } a = \frac{\sqrt{3}}{3}$$

$$\begin{array}{c} \text{développer } ((a-i)^3) \\ a^3 - 3ia^2 - 3a + i \end{array}$$