

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

$$(1-i)^5$$

$$-4+4i$$

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

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

developper  $(a-i)^3$

$$a^3 - 3ia^2 - 3a + i$$

$$z \text{ réel} \Leftrightarrow \text{Im}(z) = 0$$

$$\Leftrightarrow 1 - 3a^2 = 0$$

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

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

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