$\forall\ a,b$ des expressions littérales,

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1

Blaise Pascal

$$(a+b)^2 = a^2+2ab+b^2$$

$$(a+b)^3 = a^3+3a^2b+3ab^2+b^3$$

$$(a+b)^4 = a^4+4a^3b+6a^2b^2+4ab^3+b^4$$

$\vdots$

$$(a+b)^n = \sum_{k=0}^{n} \binom{n}{k} \cdot a^{n-k} \cdot b^k \qquad \binom{n}{k} = \frac{n!}{(n-k)!\cdot k!}$$

$$(a-b)^2 = (a+(-b))^2 = a^2+2a(-b)+b^2 = a^2-2ab+b^2$$

$$(a-b)^3 = a^3-3a^2b+3ab^2-b^3$$

$$(a-b)^4 = a^4-4a^3b+6a^2b^2-4ab^3+b^4$$

$\vdots$

$$(a-b)^n = \sum_{k=0}^{n} (-1)^k \cdot \binom{n}{k} \cdot a^{n-k} \cdot b^k$$

$\forall a,b \qquad a^2-b^2=(a-b)(a+b)$

$$a^3-b^3=(a-b)(a^2+ab+b^2)$$

$\forall a,b \qquad (a-b) \mid a^n-b^n$

$\forall n\in\mathbb{N}^*$

$\iff \exists\, Q\in\mathbb{R}[a;b]$ tq.

$$a^n-b^n=(a-b)\cdot Q \qquad \text{démo ?}$$

$$a^4-b^4=(a-b)(a+b)(a^2+b^2)$$

démo $\qquad a^5-b^5=(a-b)(a^4+a^3b+a^2b^2+ab^3+b^4)$

$$\boxed{\begin{aligned}&a^5+\cancel{a^4b}+\cancel{a^3b^2}+\cancel{a^2b^3}+\cancel{ab^4}\\&-\cancel{a^4b}-\cancel{a^3b^2}-\cancel{a^2b^3}-\cancel{ab^4}-b^5\end{aligned}}$$

$$a^6-b^6=(a^3-b^3)(a^3+b^3)$$

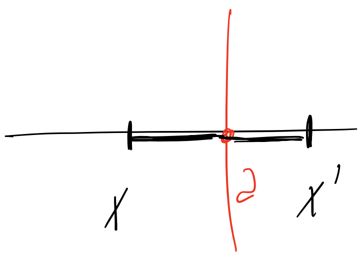
$$=(a-b)(a^2+ab+b^2)\cdot(a+b)(a^2-ab+b^2)$$

$\forall\, x, m, n$

$$(x+m)(x+n) = x^2 + \underbrace{(m+n)}_{\text{somme}}\, x + \underbrace{m \cdot n}_{\text{produit}}$$

$\forall\, a, b, c \in \mathbb{R}$ tq. $a \neq 0$ et $b^2 - 4ac \geq 0$

$$ax^2 + bx + c = 0 \iff x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



$$x' = 2a - x = a + (a - x)$$

$\forall\, a, b, c \in \mathbb{R}$ tq. $a \neq 0$

$$f(x) = ax^2 + bx + c \qquad s = -\frac{b}{2a}$$

Aff. $f(2s - x) = f(x)$

$$f(2s - x) = f\left(2 \cdot \left(-\frac{b}{2a}\right) - x\right)$$

$$= f\left(-\frac{b}{a} - x\right)$$

$$= 2\left(x+\frac{b}{2}\right)^2 - \frac{b^2}{2} - bx + c$$

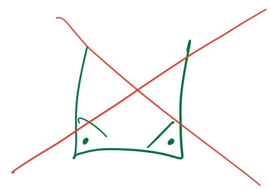
$$= 2\left(x^2 + \frac{2b}{2}x + \frac{b^2}{2^2}\right) - \frac{b^2}{2} - bx + c$$

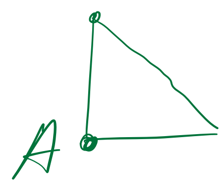
$$= 2x^2 + 2bx + \frac{b^2}{2} - \frac{b^2}{2} - bx + c$$

$$= 2x^2 + bx + c = f(x)$$

CQF

$\triangle ABC$ est isocèle et rectangle en A.





$\Rightarrow \beta = \gamma = 45^\circ = \frac{\pi}{4}$

$\triangle ABC$ est isocèle ou rectangle   3 examples
