$\boxed{30}$

$c \in \mathbb{R}$

$$P(x) = x^5 - 5x^3 + 4x - c$$

has five distinct real roots:

$$x_1, x_2, \ldots, x_5$$

Compute sum of absolute values of coeff's of the polynomial:

$$Q(x) = (x - x_1^2)(x - x_2^2) \ldots (x - x_5^2)$$

Hint $Q(x^2) = (x^2 - x_1^2)(x^2 - x_2^2) \ldots (x^2 - x_5^2) =$

$$= (x - x_1)(x + x_1)(x - x_2)(x + x_2) \ldots (x - x_5)(x + x_5)$$

$$= \underbrace{(x - x_1)(x - x_2) \ldots (x - x_5)}_{P(x)} \cdot$$

$$\underbrace{(x + x_1)(x + x_2) \ldots (x + x_5)}_{-P(-x)} =$$

$$= \boxed{-P(x) \cdot P(-x)}$$

$P(x) = x^5 - 5x^3 + 4x - c$

$$-\left(x^5 - 5x^3 + 4x - c\right)\cdot\left(-x^5 + 5x^3 - 4x - c\right)$$

$$= \left(x^5 - 5x^3 + 4x - c\right)\left(x^5 - 5x^3 + 4x + c\right) =$$

$$= \left(x^5 - 5x^3 + 4x\right)^2 - c^2$$

$$= x^{10} - 10x^8 + 33x^6 - 40x^4 + 16x^2 - c^2$$

$$\Downarrow$$

$$Q(x) = x^5 - 10x^4 + 33x^3 - 40x^2 + 16x - c^2$$

$$\boxed{1 + 10 + 33 + 40 + 16 + c^2 = 100 + c^2}$$

$$\boxed{31}$$

$$x^n \pm x^{n-1} \pm \dots \pm x \pm 1$$

All roots are real?

$r_1, r_2, \ldots, r_n$ — are roots

$\sum_{i=1}^{n} r_i^2 = -1$ or 3

$\boxed{\sum_{i=1}^{n} r_i^2 = 3}$

$\sum_{i=1}^{n} r_i = ?$

$\boxed{\sum_{i<j} r_i r_j = -1}$

AM-GM

$$\sum r_i^2 = \Big(\sum r_i\Big)^2 - 2\sum r_i r_j$$

$$1 \pm 2$$

$$\frac{3}{n} = \frac{\sum_{i=1}^{n} r_i^2}{n} \geq \sqrt[n]{\underbrace{r_1^2 r_2^2 \cdots r_n^2}_{(\pm 1)^2}} = ?\ 1$$

$\boxed{n \leq 3}$

$\boxed{r_1^2 = r_2^2 = r_3^2}$

Fr = $\boxed{n = 3}$

$(x-1)(x+1)(x+1)$
$(x-1)(x-1)(x+1)$

$n=2$

$x^2 \pm x - 1 \rightsquigarrow$ $\square$

$n=1$ $x \pm 1$

$$P(x) = x^n - 2n x^{n-1} + 2n(n-1) x^{n-2} + \dots + a_0$$

has only real roots.

only they are fixed

Find these roots

$\sum_1^1 (x_i - 1)^2 = 4n - 4n + n = n$

$r_1, r_2, \dots, r_n$ – roots

$$\sum_1^1 r_i = 2n$$

$$\sum_1^1 r_i r_j = 2n(n-1)$$

$$\sum_1^1 r_i^2 = \left(\sum_1^1 r_i\right)^2 - 2 \sum_1^1 r_i r_j =$$

$$= (2n)^2 - 2 \cdot 2n(n-1) = 4n$$

$$\sum_{i=1}^{n} (x_i - 2)^2 = \sum_1^n x_i^2 - 4\sum_1^n x_i + n \cdot 4$$

$$= \boxed{4n - 4 \cdot 2n + 4n = 0}$$

$$\Downarrow$$

all $\boxed{x_i = 2}$

Last Vict Ex

$\boxed{33}$

$\boxed{28}$

$\boxed{29}$

[illegible]

$f: \mathbb{N} \to \mathbb{N}$.