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Professor Ricardinho

Matemática – Frente B



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AULAS
22 e 23

Estudo dos polígonos

ASSISTA À AULA



Professor Ricardinho

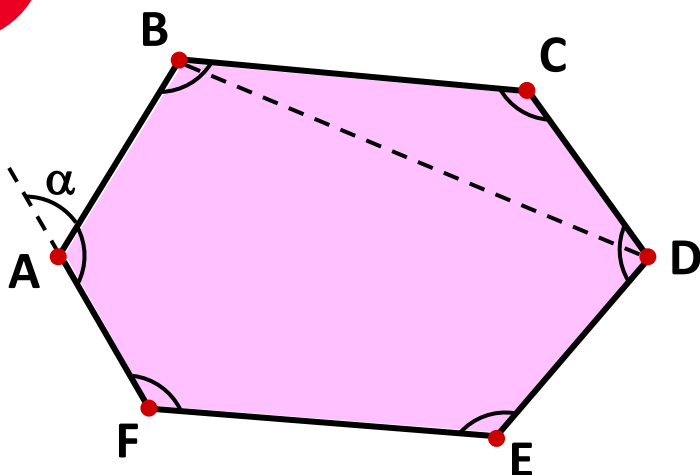


Matemática – Frente B

GEOMETRIA PLANA



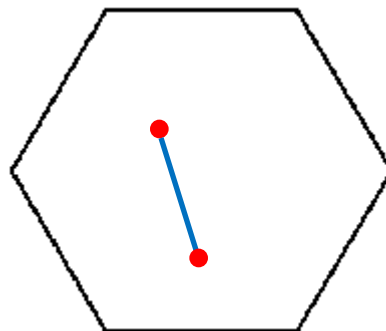
ESTUDO DOS POLÍGONOS



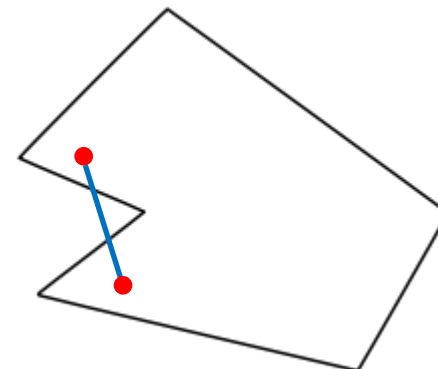
- ✓ Lados AB, AC, CD, DE, EF e FA.
- ✓ Os vértices A, B, C, D, E e F.
- ✓ Os ângulos internos A, B, C, D, E e F.
- ✓ α é ângulo externo relativo ao vértice A.
- ✓ Diagonal BD.

CLASSIFICAÇÃO

Convexos



Côncavos



NOMENCLATURA

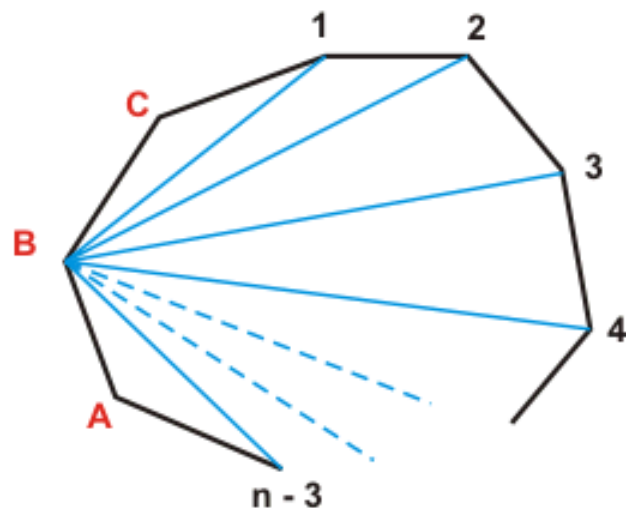
n	Polígono	n	Polígono
3	triângulo	9	eneágono
4	quadrilátero	10	decágono
5	pentágono	11	undecágono
6	hexágono	12	dodecágono
7	heptágono	15	pentadecágono
8	octógono	20	icoságono

GEOMETRIA PLANA



NÚMERO DE DIAGONAIS

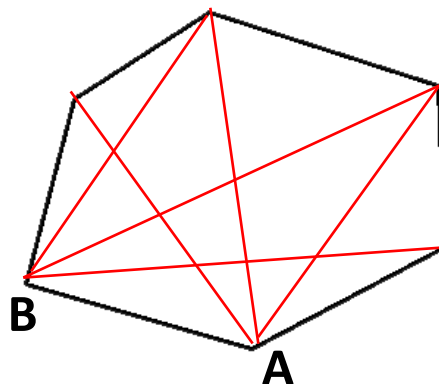
polígono com n vértices



De cada vértice partem $(n - 3)$ diagonais

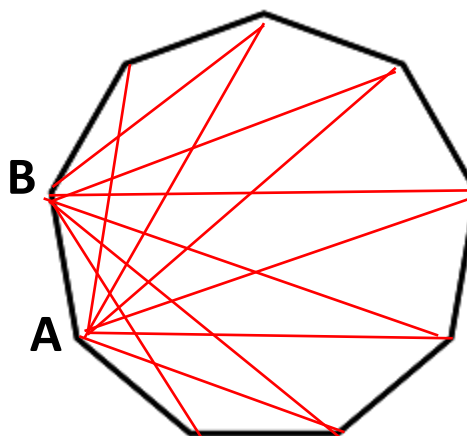
$$d = \frac{n(n - 3)}{2}$$

Hexágono $n = 6$



$$\frac{6 \times 3}{2} = 9 \text{ diagonais}$$

Eneágono $n = 9$



$$\frac{9 \times 6}{2} = 27 \text{ diagonais}$$

EXERCÍCIO 1

Quantas diagonais possui um octógono convexo?

$$d = \frac{n(n - 3)}{2} \Rightarrow d = \frac{8(8 - 3)}{2}$$

$$d = \frac{8.5}{2} \Rightarrow d = 20$$

EXERCÍCIO 2

Um polígono convexo possui um número de diagonais que é o triplo do número de lados. Calcule quantos lados possui esse polígono:

$$d = 3n$$

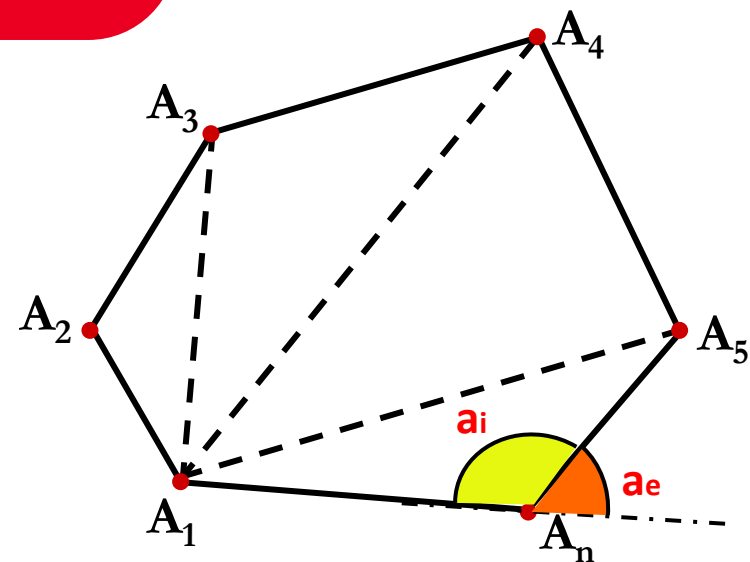
$$d = \frac{n(n - 3)}{2} \Rightarrow 3n = \frac{n(n - 3)}{2}$$

$$\Rightarrow 6 = n - 3 \Rightarrow n = 9$$

GEOMETRIA PLANA



ÂNGULOS NUM POLÍGONO

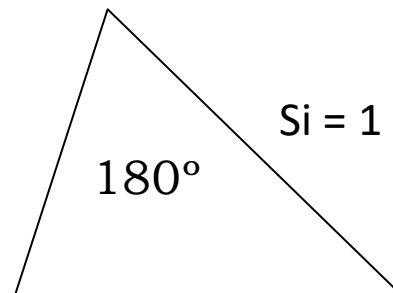


$$a_i + a_e = 180^\circ$$

SOMA DOS ÂNGULOS INTERNOS

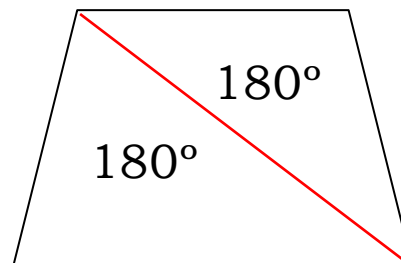
$$S_i = 180^\circ(n - 2)$$

3 lados



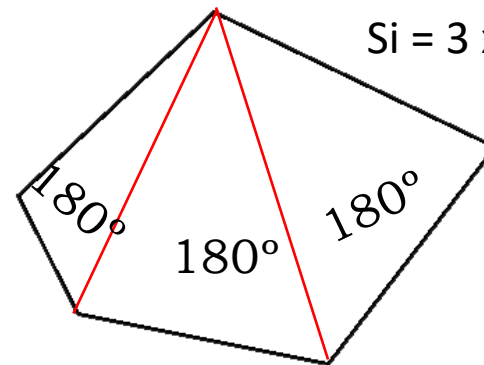
$$Si = 1 \times 180^\circ = 180^\circ$$

4 lados



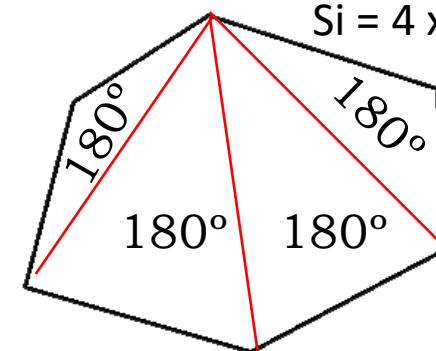
$$Si = 2 \times 180^\circ = 360^\circ$$

5 lados

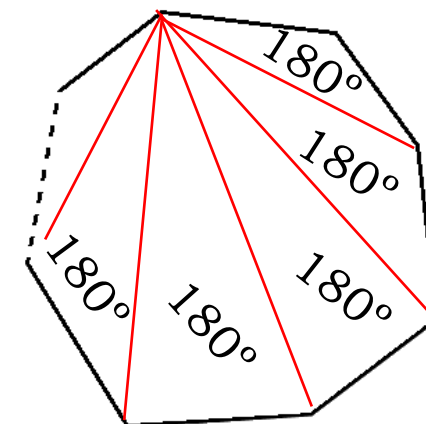


$$Si = 3 \times 180^\circ = 540^\circ$$

6 lados



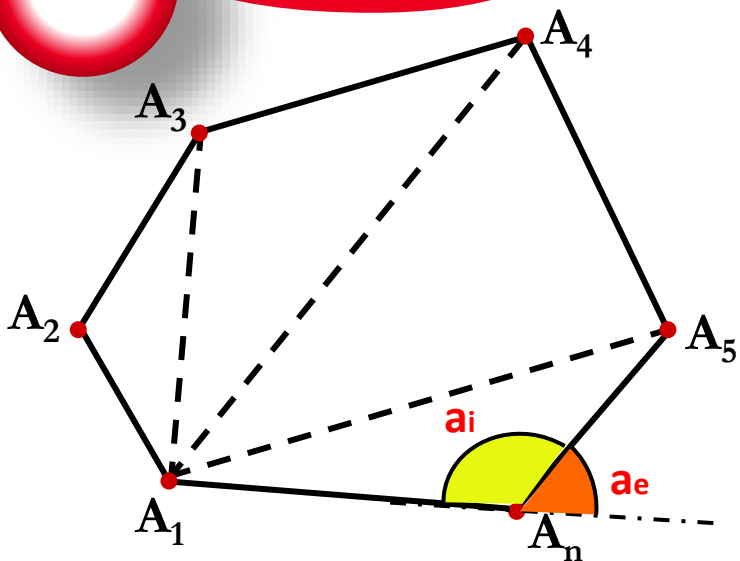
$$Si = 4 \times 180^\circ = 720^\circ$$



nº de triângulos

$$Si = 180^\circ(n - 2)$$

ÂNGULOS NUM POLÍGONO



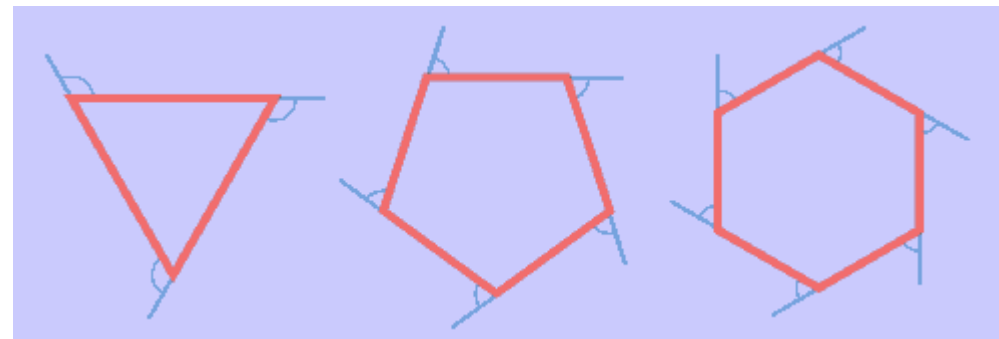
$$a_i + a_e = 180^\circ$$

SOMA DOS ÂNGULOS INTERNOS

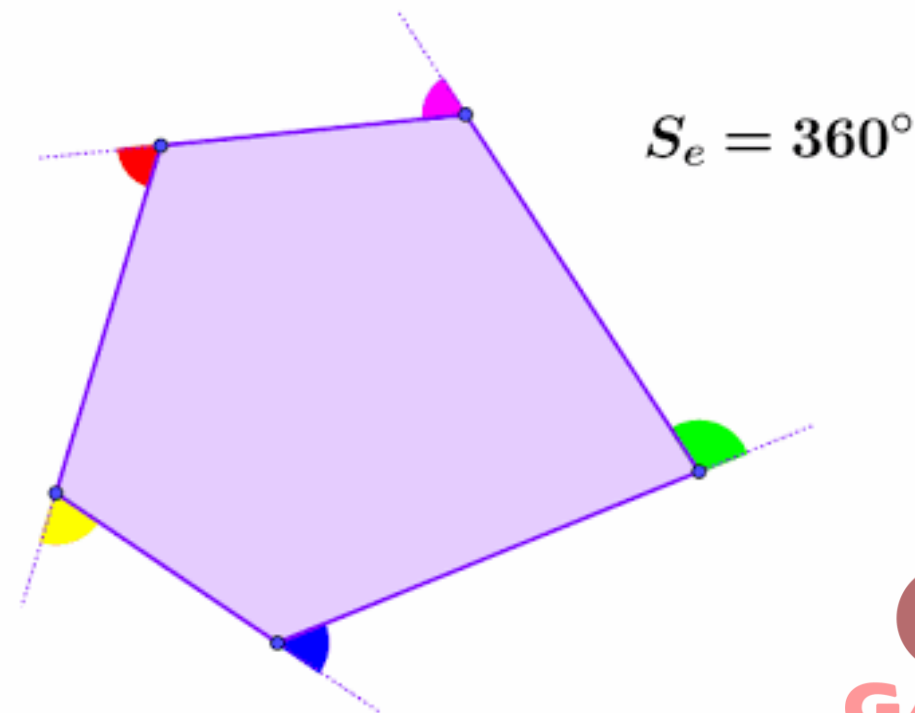
$$S_i = 180^\circ(n - 2)$$

SOMA DOS ÂNGULOS EXTERNOS

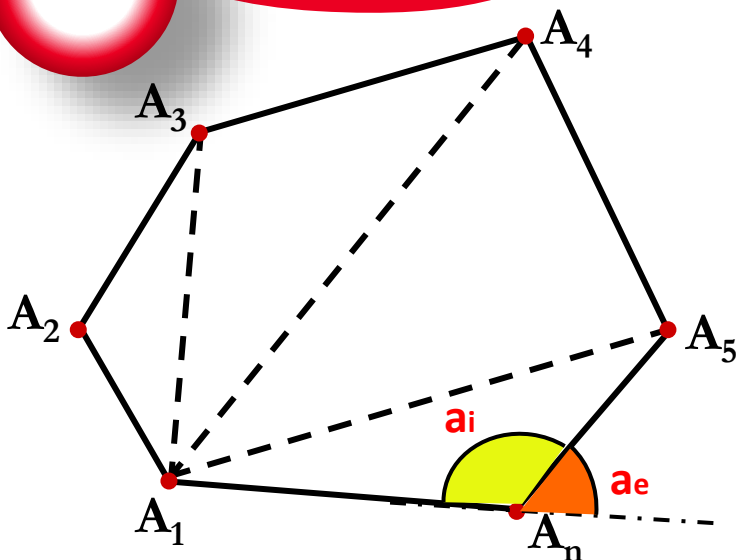
$$S_e = 360^\circ$$



Soma das medidas dos ângulos externos
de um polígono



ÂNGULOS NUM POLÍGONO



$$a_i + a_e = 180^\circ$$

SOMA DOS ÂNGULOS INTERNOS

$$S_i = 180^\circ(n - 2)$$

SOMA DOS ÂNGULOS EXTERNOS

$$S_e = 360^\circ$$

EXERCÍCIO

Em relação ao octógono regular, determine:

a) Soma dos ângulos internos

$$S_i = 180^\circ(n - 2)$$

$$S_i = 180^\circ(8 - 2)$$

$$S_i = 180^\circ \cdot 6 \Rightarrow S_i = 1080^\circ$$

b) Soma dos ângulos externos

$$S_e = 360^\circ$$

c) Cada ângulo interno e externo

$$a_i = \frac{S_i}{n}$$

$$a_i = \frac{1080^\circ}{8}$$

$$a_i = 135^\circ$$

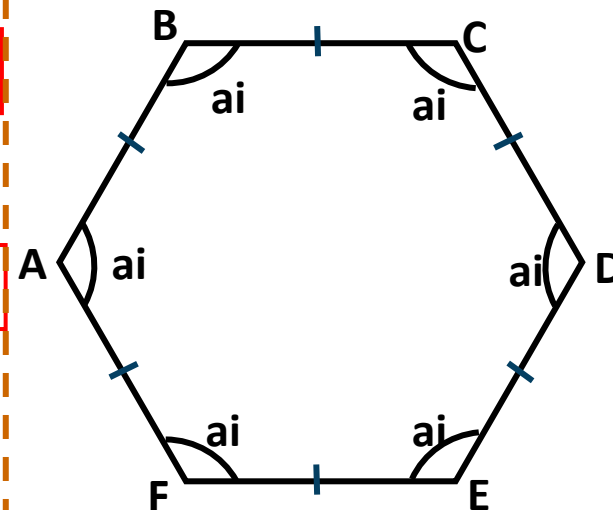
$$a_e = \frac{S_e}{n}$$

$$a_e = \frac{360^\circ}{8}$$

$$a_e = 45^\circ$$

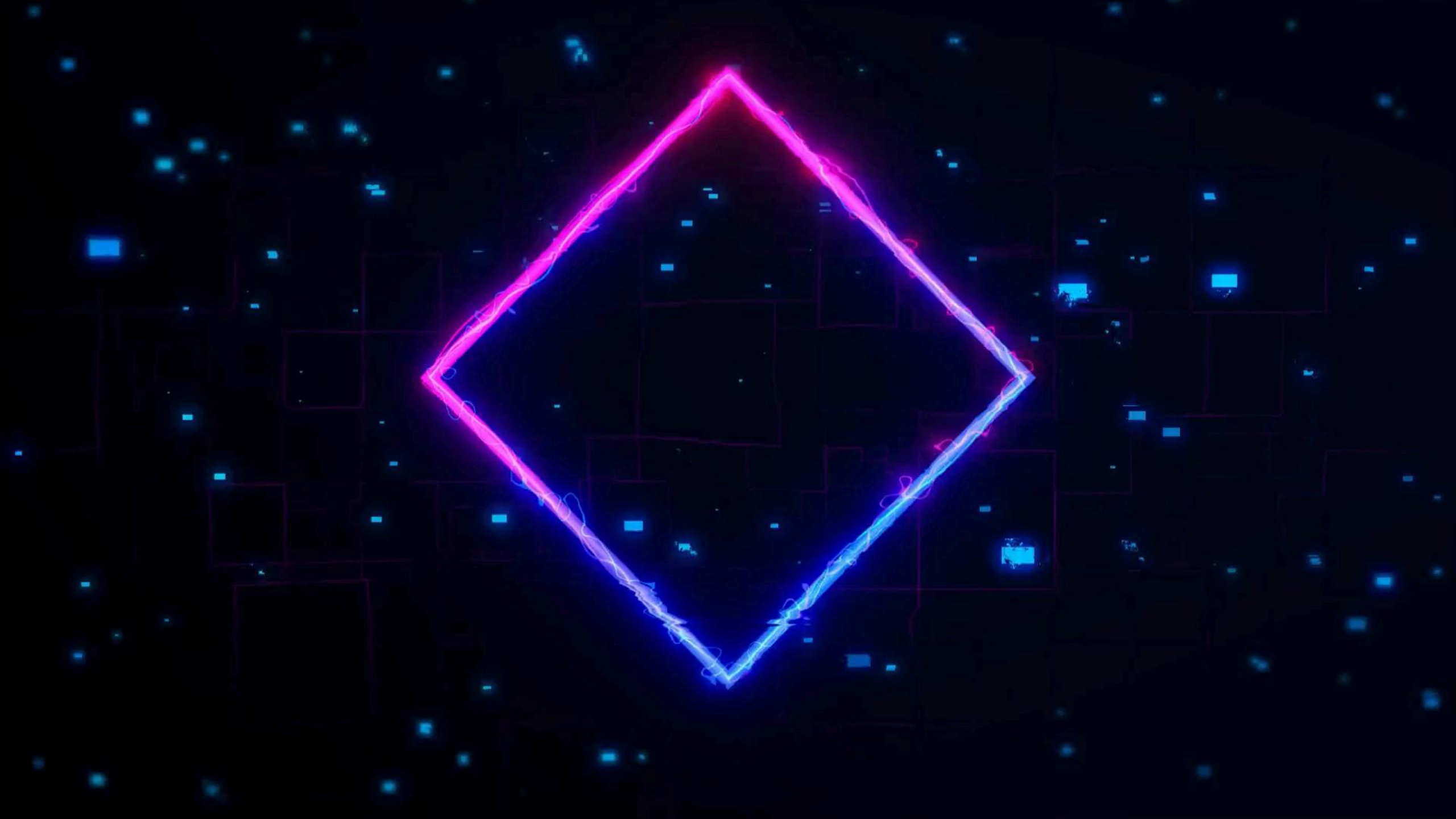


Polígonos Regulares

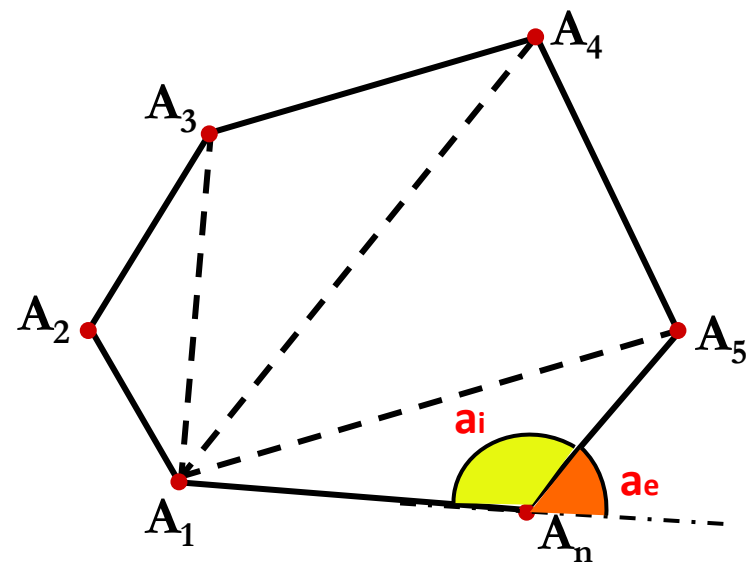


$$a_i = \frac{S_i}{n}$$

$$a_e = \frac{S_e}{n}$$



RESUMO DA AULA



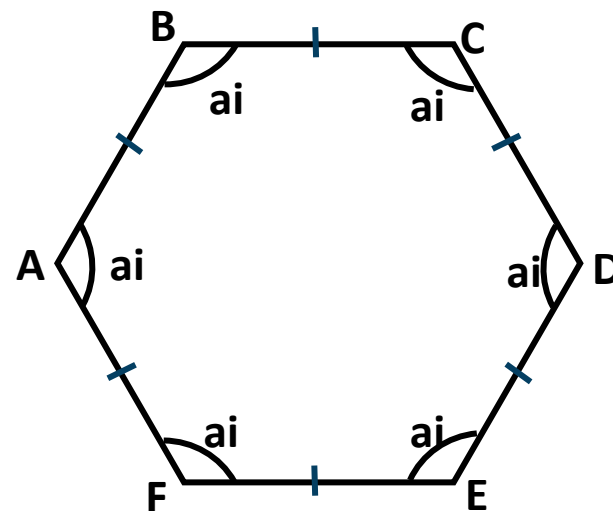
$$d = \frac{n(n-3)}{2}$$

$$a_i + a_e = 180^\circ$$

$$S_i = 180^\circ(n-2)$$

$$S_e = 360^\circ$$

Polígonos Regulares



$$a_i = \frac{S_i}{n}$$

$$a_e = \frac{S_e}{n}$$