

**2<sup>a</sup>  
SÉRIE**

**CANAL SEDUC-PI2**



PROFESSOR (A):



DISCIPLINA:



CONTEÚDO:



TEMA GERADOR:



DATA:

**ALEXANDRO MATEMÁTICA  
KESLLER**

**GEOMETRIA  
ESPACIAL  
(POLIEDROS)**

**CIÊNCIA  
NA ESCOLA**

**07.08.2019**

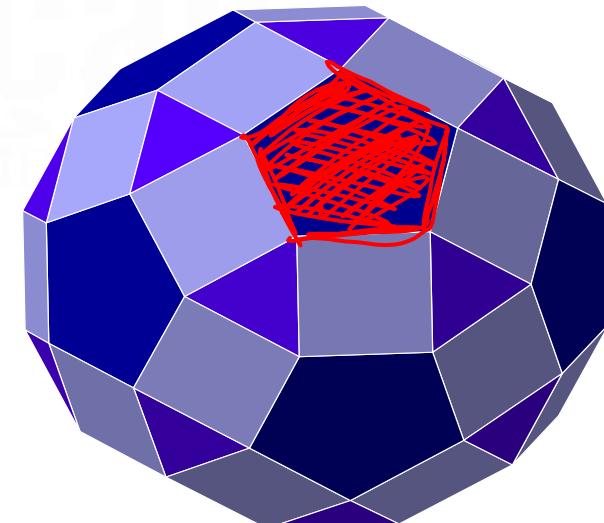
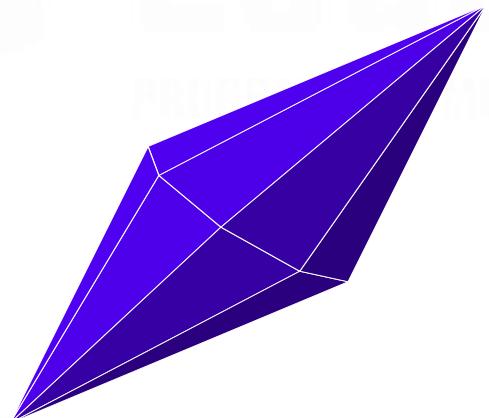
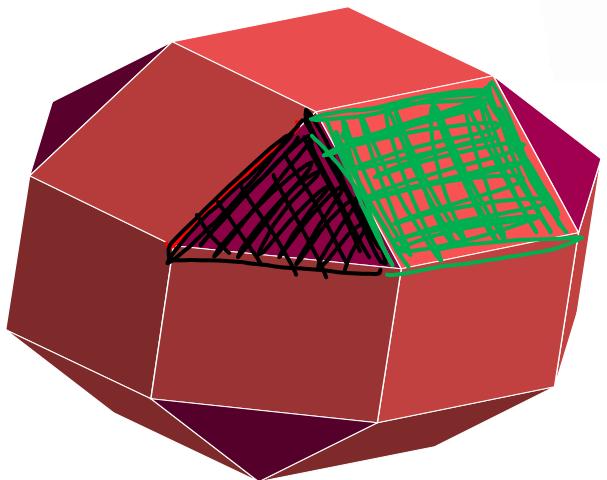
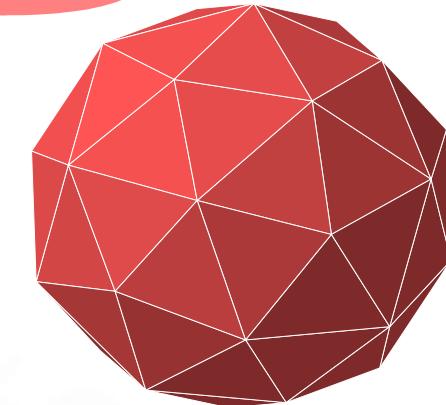
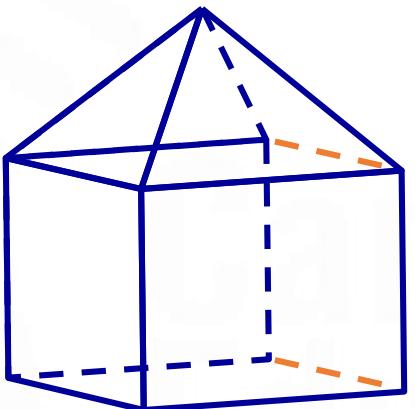
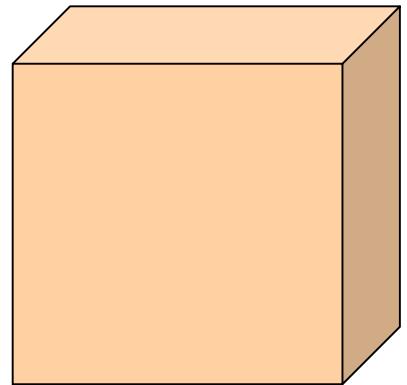
# ROTEIRO DE AULA

## GEOMETRIA ESPACIAL I- (POLIEDROS)

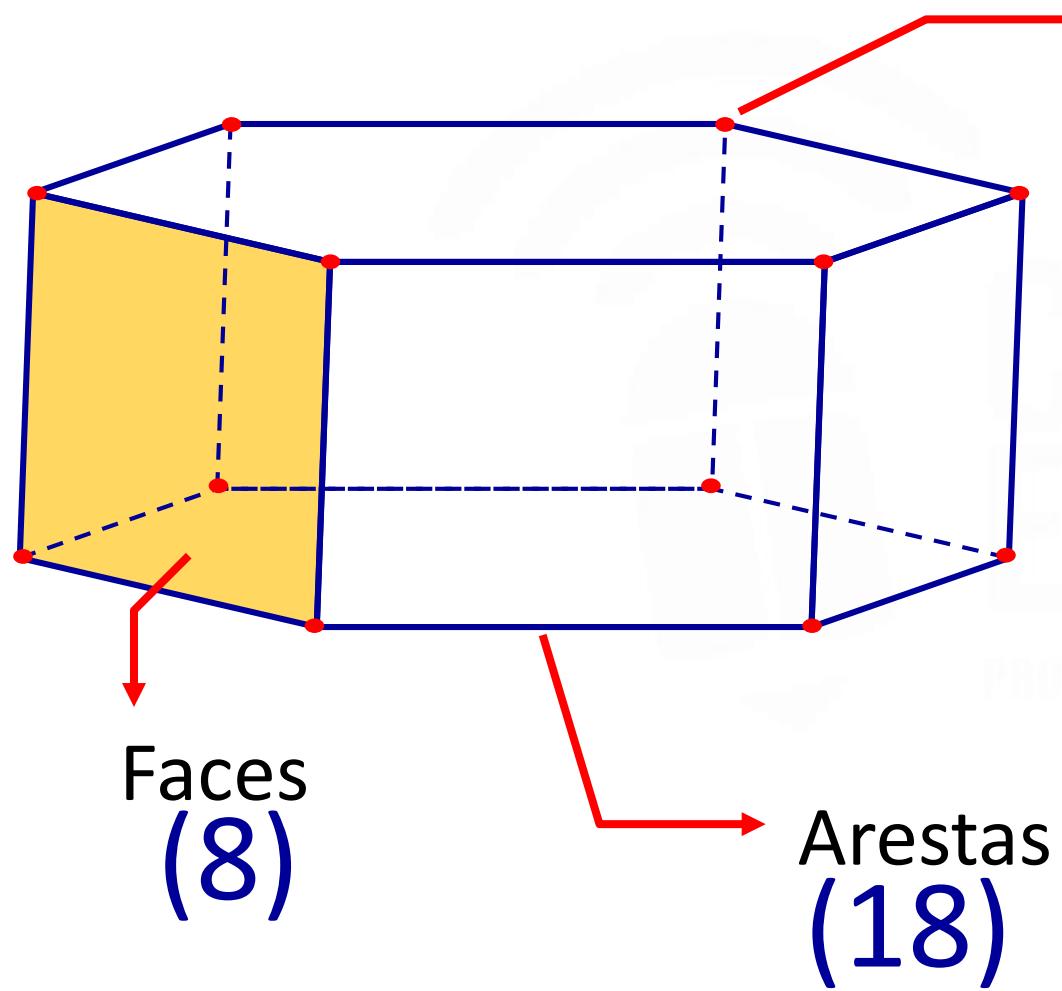
- Definição e elementos;
- Relação de Euler

# POLIEDROS

*Sólidos geométricos limitados por polígonos.*



# Elementos do Poliedro



Vértices  
**(12)**

Faces  
**(8)**

Arestas  
**(18)**

$$V - A + F = 2$$

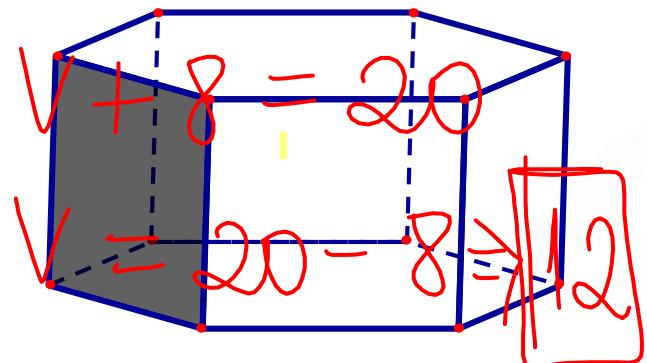
**Relação de Euler**

$$V + F = A + 2$$

$$12 + 8 = 18 + 2$$

$$20 = 20$$

$$V + 8 = 18 + 2$$



# Elementos do Poliedro

Qual a quantidade de vértices, arestas e faces de um poliedro limitado por seis faces quadrangulares e duas faces hexagonais?

$$\begin{array}{r}
 + 6F_4 \\
 + 2F_6 \\
 \hline
 F = 8 \quad \checkmark
 \end{array}$$

$$A = \frac{6(4) + 2(6)}{2}$$

$$A = \frac{24 + 12}{2} = \frac{36}{2}$$

$$A = 18$$

$$V + F = A + 2$$

$$V + 8 = 18 + 2$$

$$V = 12$$

# Exemplo Proposto

Um poliedro possui cinco faces triangulares, cinco faces quadrangulares e uma pentagonal, determine as arestas, faces e vértices.

$$\begin{array}{r}
 5 F(3) \\
 + 5 F(4) \\
 1 F(5) \\
 \hline
 F = 11
 \end{array}$$

$$A = \frac{5(3) + 5(4) + 1(5)}{2}$$

$$A = \frac{15 + 20 + 5}{2}$$

$$\textcircled{V} + \textcircled{F} = \textcircled{A} + 2$$

$$A = \frac{40}{2}$$

$$A = 20$$

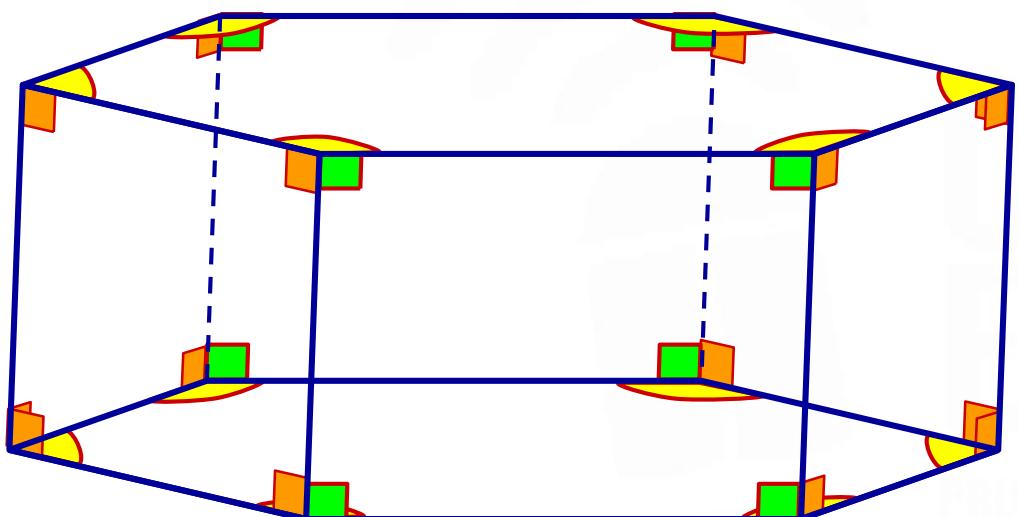
$$F = 11$$

$$V + 11 = 20 + 2$$

$$V = 11$$

$$V + 11 = 22 \rightarrow V = 22 - 11$$

# Soma dos ângulos das faces



Nº VÉRTICES

$$S = (V - 2) \cdot 360^\circ$$

$$S = (12 - 2) \cdot 360^\circ$$

$$S = (10) \cdot 360^\circ$$

$$S = 3600^\circ$$

## Atividade Proposta

Qual o número de vértices de um poliedro convexo de 10 faces quadrangulares

$$\begin{array}{r}
 + 10F(4) \\
 \hline
 F = 10
 \end{array}$$

$$V + F = A + 2$$

$$V + 10 = 20 + 2$$

$$V + 10 = 22$$

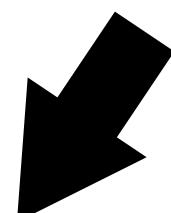
$$V = 22 - 10 \rightarrow$$

$$V = 12$$

$$A = \frac{10(4)}{2}$$

$$A = \frac{40}{2}$$

$$A = 20$$



## Atividade Proposta

Um poliedro convexo possui 9 faces triangulares, 9 faces quadrangulares, 1 face pentagonal e 1 face hexagonal. Quantos vértices tem esse poliedro?

$$\begin{array}{r}
 \begin{array}{c}
 9 \\
 F(3) \\
 \swarrow \\
 9 \\
 F(4) \\
 \swarrow \\
 + \\
 1 \\
 F(5) \\
 \swarrow \\
 1 \\
 F(6)
 \end{array} \\
 \hline
 F = 20
 \end{array}$$

$$A = \frac{9(3) + 9(4) + 1(5) + 1(6)}{2}$$

$$A = \frac{27+36+5+6}{2}$$

$$A = 37$$

$$V + F = A + 2$$

$$V + 20 = 37 + 2$$

$$V = 19$$



## Atividade Proposta



Um poliedro convexo possui **3** faces pentagonais e **algumas** faces triangulares. Qual o número de faces desse poliedro, sabendo que o número de arestas é o quádruplo do número de faces triangulares?

$$\begin{array}{r} + \\ \begin{matrix} 3F(5) \\ \times F(3) \end{matrix} \\ \hline F = 3 + x \end{array}$$

$$A = \frac{3(5) + x(3)}{2}$$

~~$$\begin{matrix} 4x \\ 1 \end{matrix} = \frac{15 + 3x}{2}$$~~

$$F = 3 + 3$$

**F = 6**

$$5x = 15$$

$$x = 3$$