

Modelação e Visualização Tridimensional em Arquitectura

U LISBOA

UNIVERSIDADE
DE LISBOA



FACULDADE DE ARQUITETURA
UNIVERSIDADE DE LISBOA

Mestrado Integrado em Arquitectura
Ano Lectivo 2022-2023 2º Semestre
Docente - Nuno Alão 3º Ano

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MVTA

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1ª Aula - 16 de fevereiro de 2023

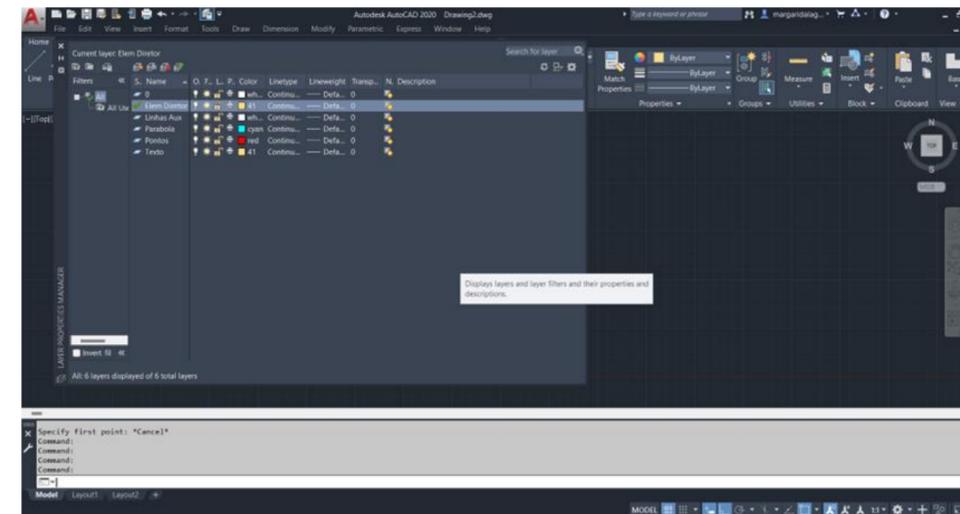
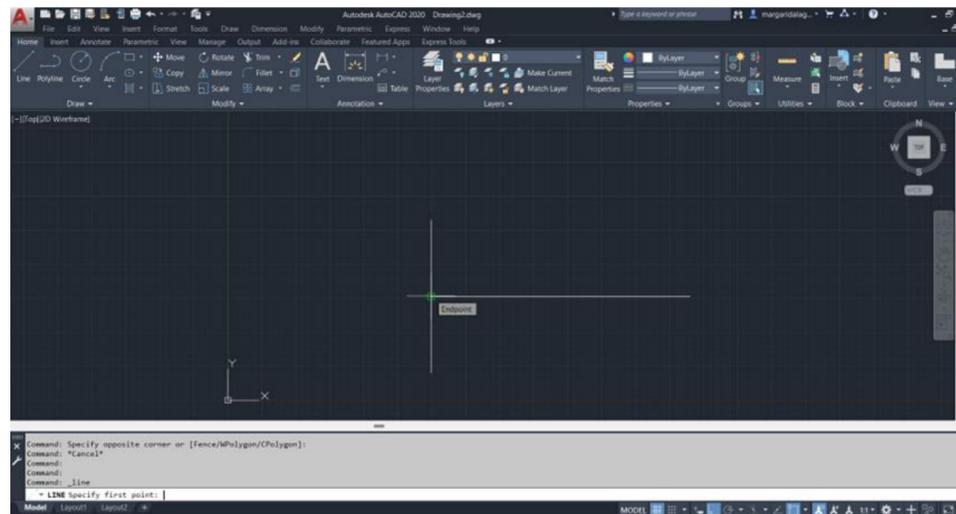
Alguns comandos utilizados:

- Revsurf;
- ORB - Orbit – orbitar em torno do desenho;
- Surftab 1 – 30;
- Surftab 2 – 30;
- Revsurf;
- Shade.

Sumário

Revisão de alguns comandos do software Autocad;
Construção de uma Parábola no software Autocad;

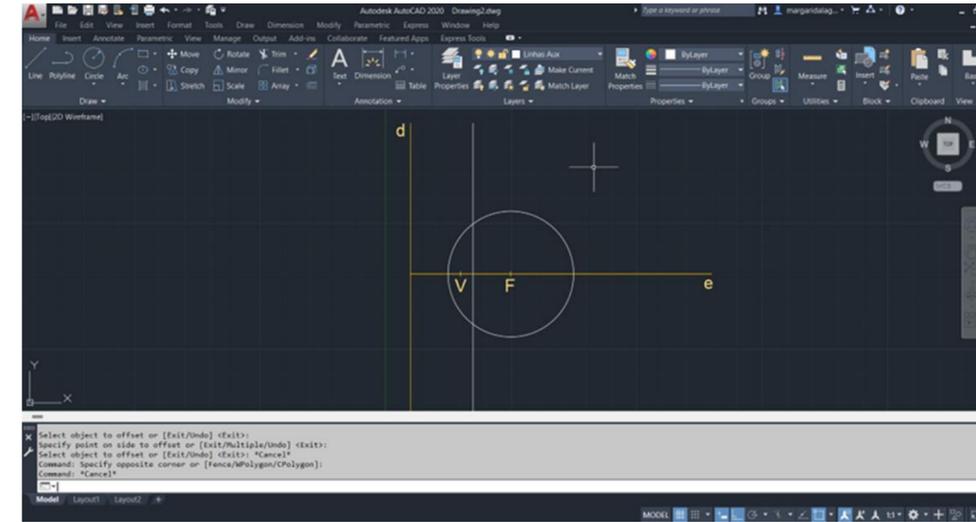
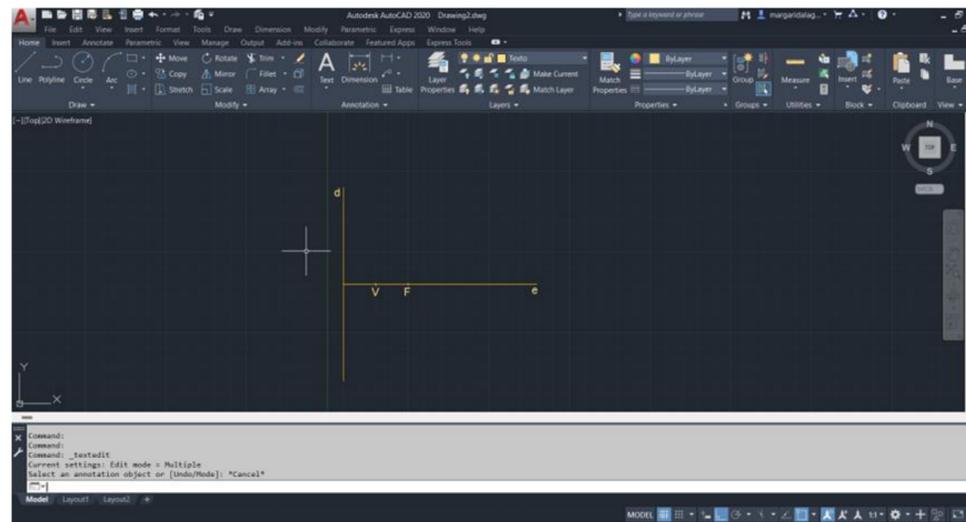
Capturas de ecrã tiradas no decorrer da aula



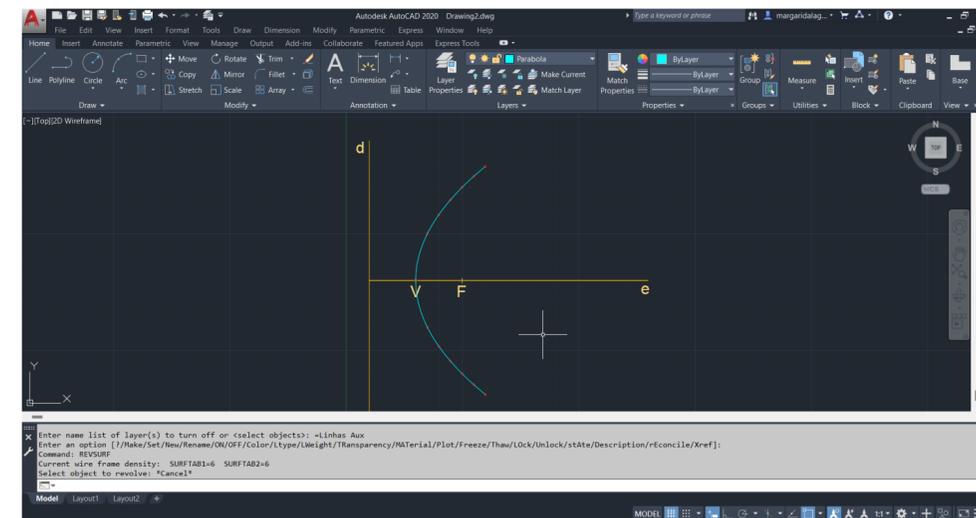
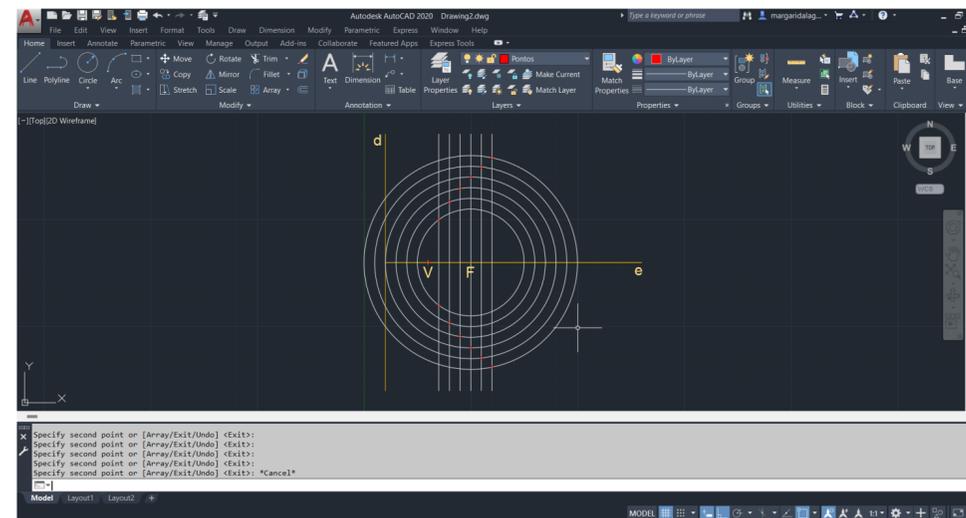
1. Dimensão da quadricula 10.

Criação de duas linhas de 120 perpendiculares entre si e criação de várias layers: **Texto, Pontos, Parábola, Linhas Auxiliares, Elemento Diretor**

Exerc. 1.1 - Superfície Parabólica

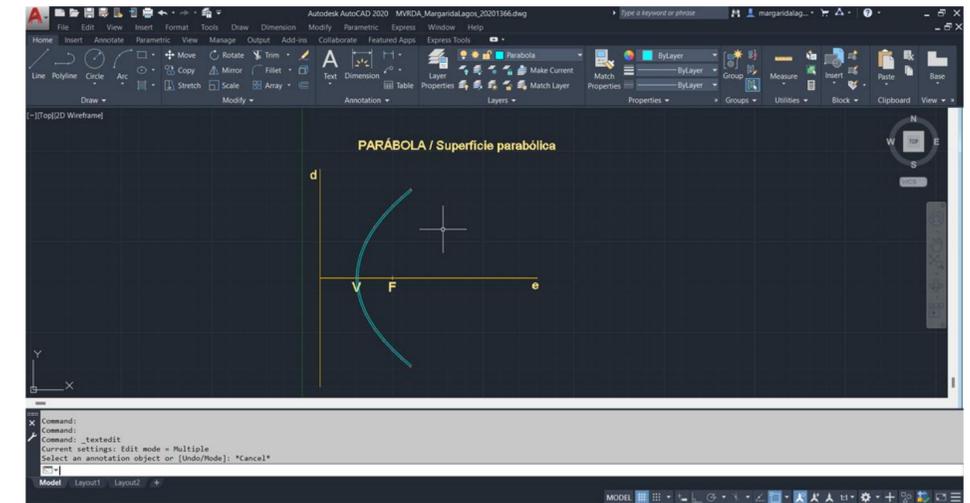
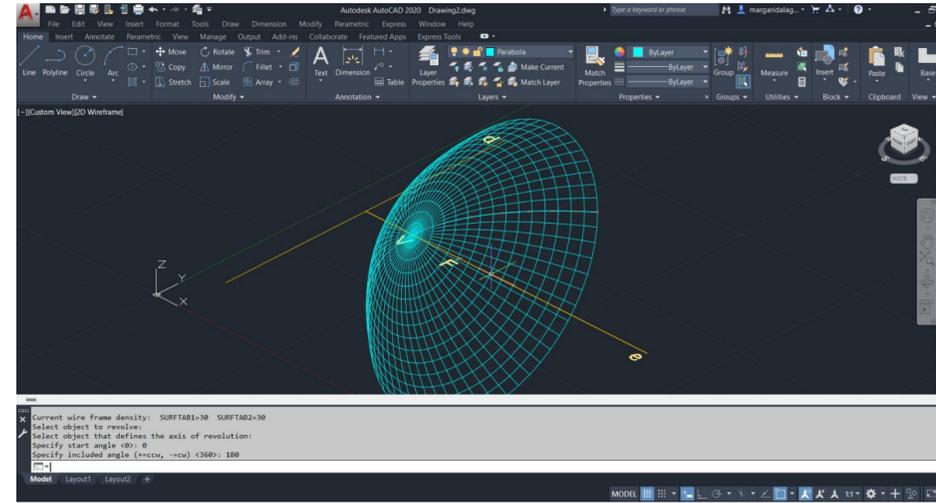
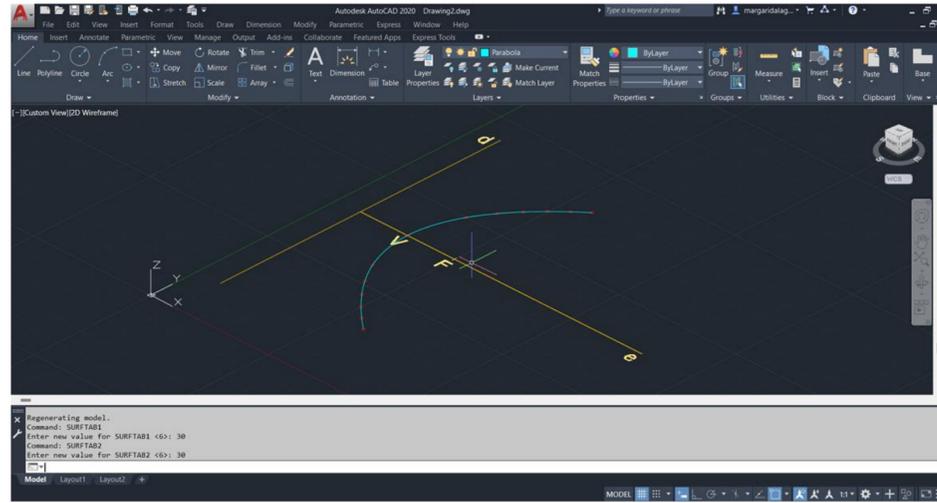


2. Colocar as linhas anteriormente criadas na layer correta e de seguida, na layer texto, adicionar as letras: eixo **(e)**, diretriz **(d)**, vértice **(V)** e do foco **(F)**, e por fim, mudar a dimensão das mesmas para o tamanho 5. De seguida, inserir as linhas de auxilio da construção da parábola, um circulo e outra linha

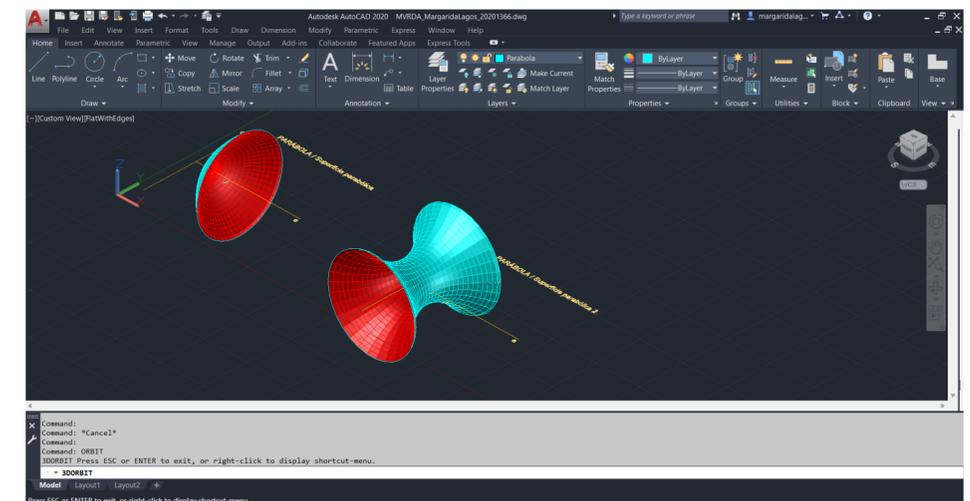
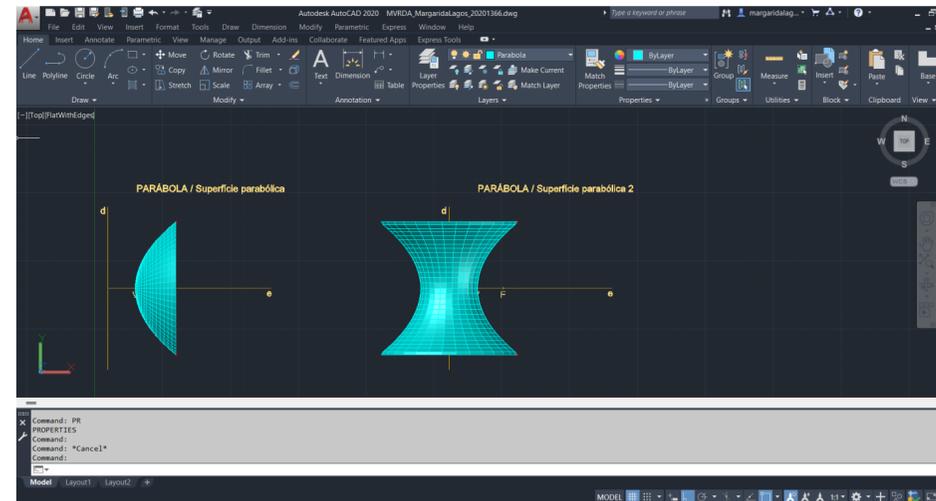
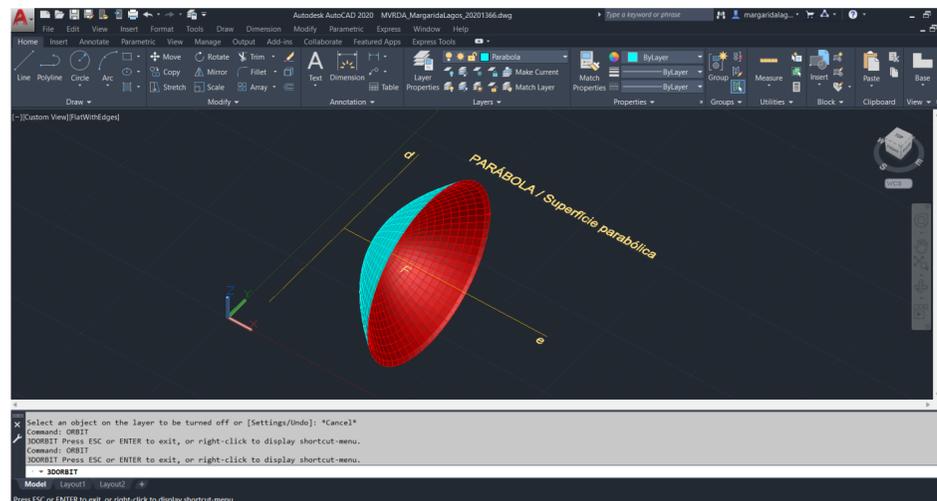


3. Continuação da inserção as linhas de auxilio da construção da parábola e quando se interseitam, encontrar os pontos que formam a parábola
Desenhar a curva da parábola

Exerc. 1.1 - Superfície Parabólica



4. Visualização após o comando **3dorbit** Utilização do comando **surftab** para a definição dos meridianos



5. Utilização do comando **shade** Conclusão dos paraboloides

Exerc. 1.1 - Superfície Parabólica

2ª Aula – 23 de fevereiro de 2023

Sumário

- Coordenadas no software AutoCad: absolutas #, relativas @ e coordenadas polares;
- Construção de polígonos e poliedros no software Autocad;

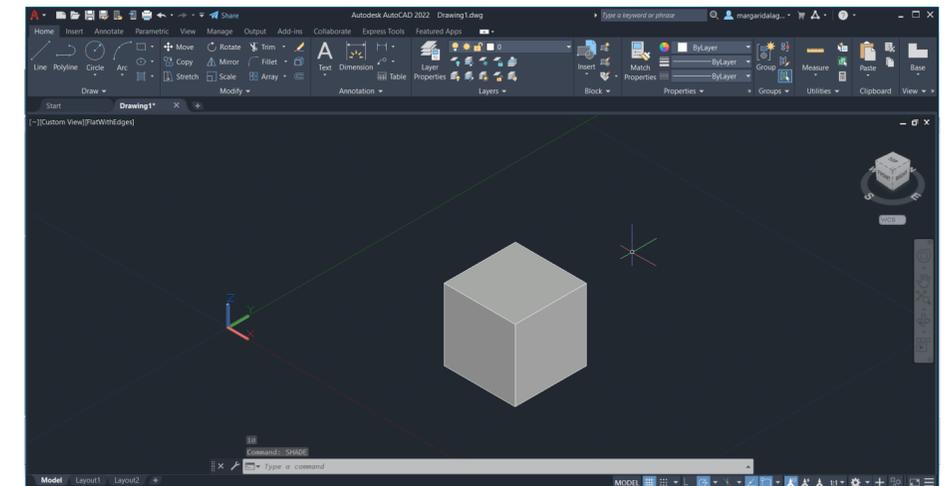
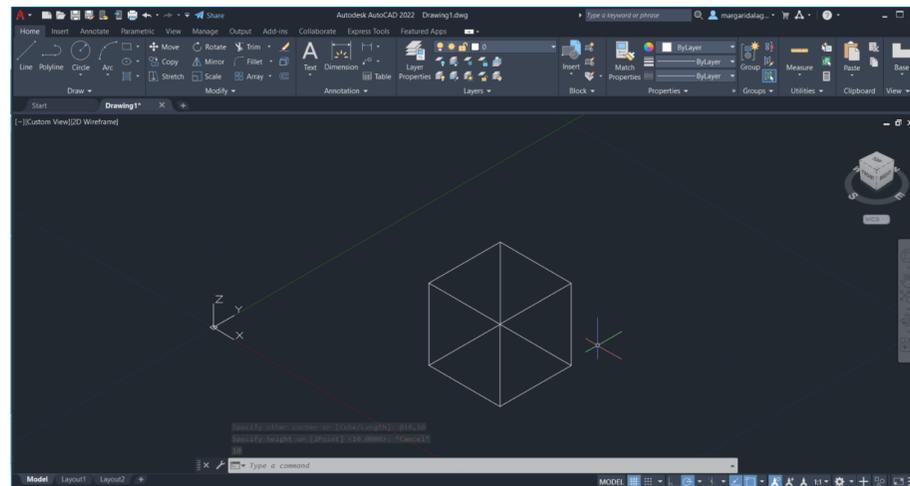
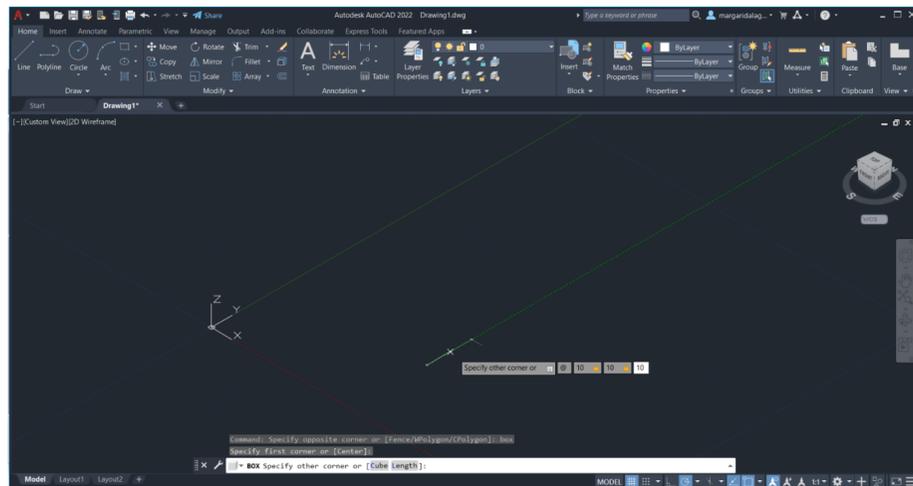
Nota: Coordenadas Absolutas - a distância dada por essas coordenadas é o ponto 0;

Coordenadas Relativas - a distância dada por essas coordenadas é relativas do último ponto;

Cartesianas X, Y - sinónimo de ortogonal, separadas por vírgulas;

Coordenadas polares - definidas por uma distância.

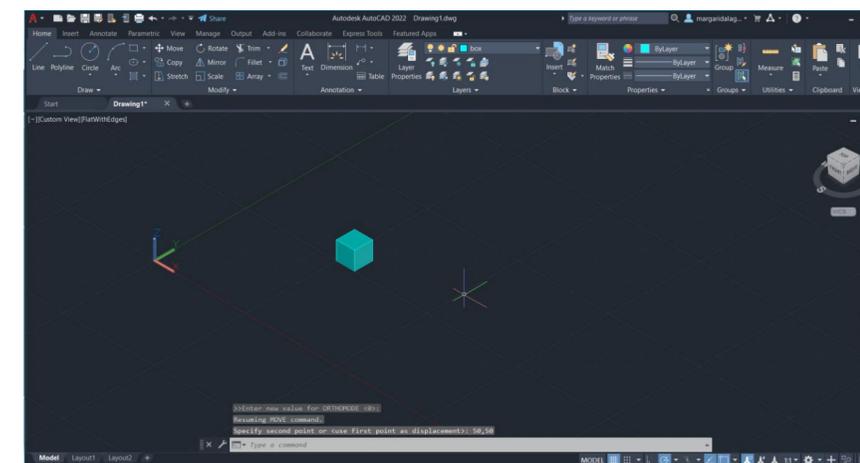
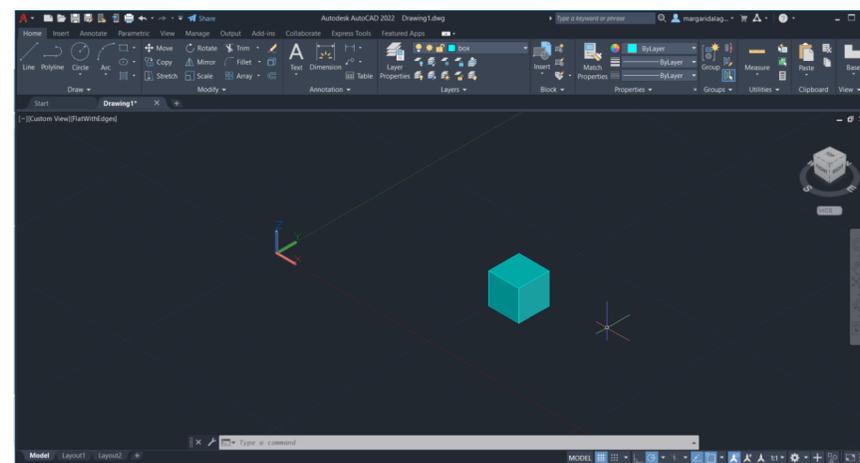
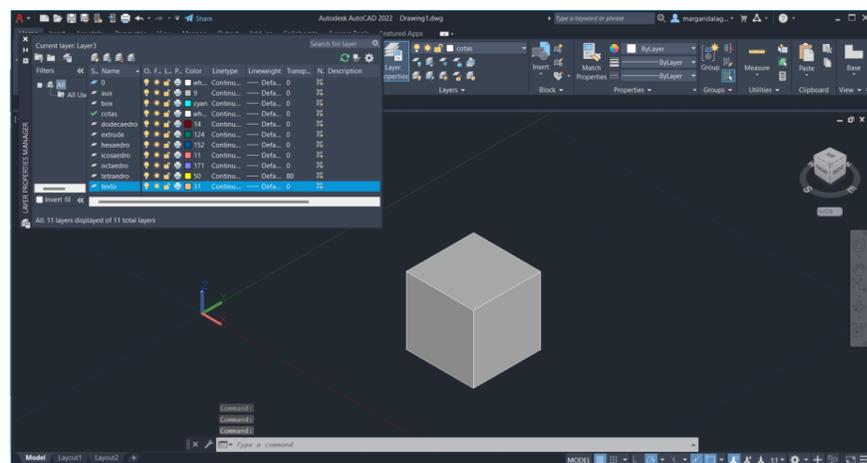
Capturas de ecrã tiradas no decorrer da aula



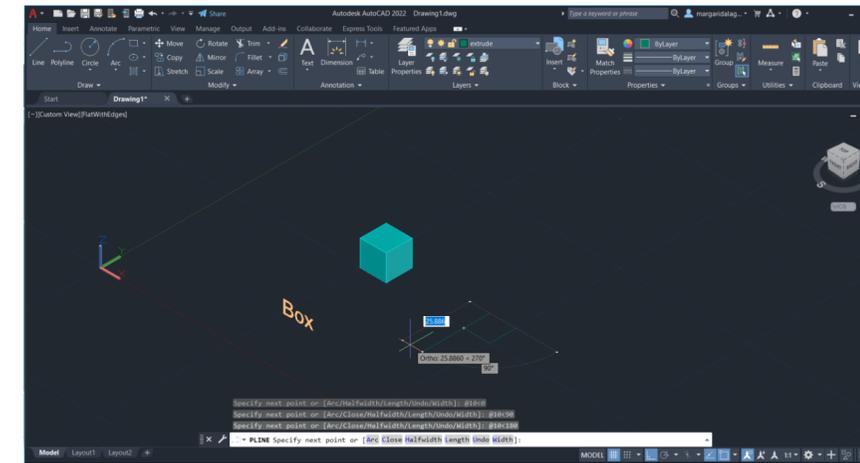
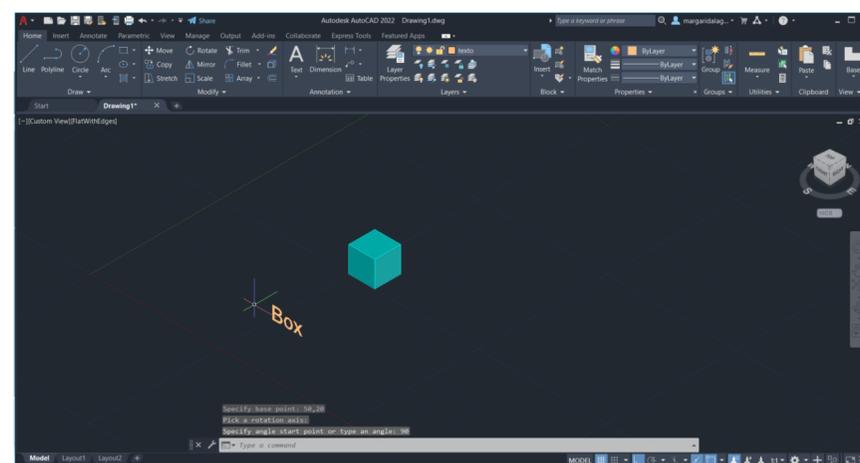
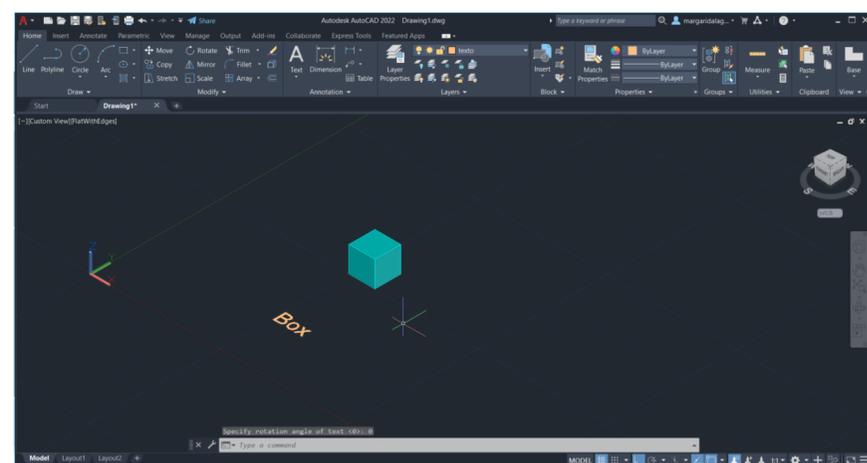
1. Utilizar o comando **box** e definir coordenada relativa @10, 10, 10

2. Dar **shade** ao cubo criado

Exerc. 2.1 - Box

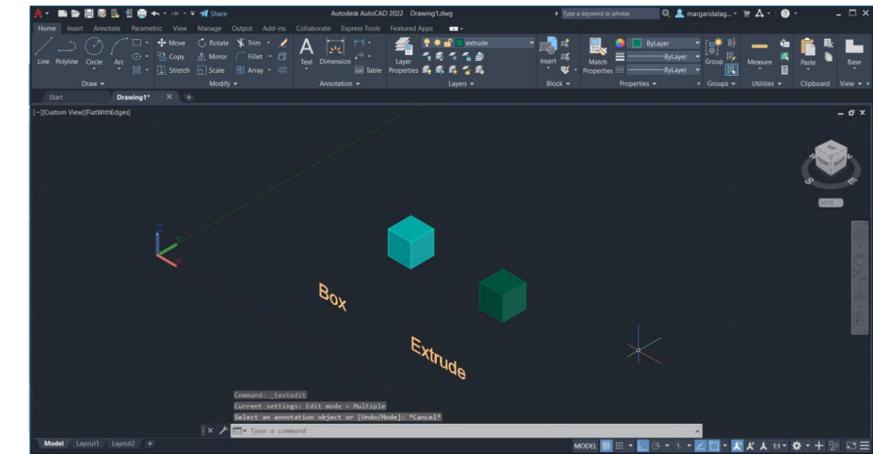
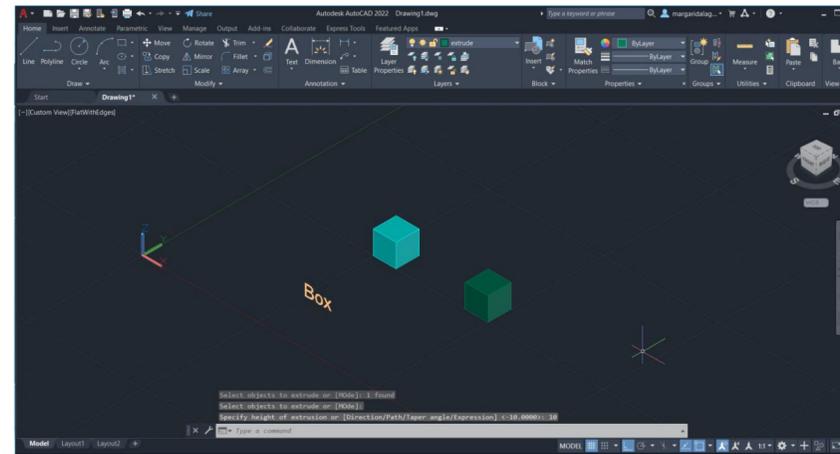
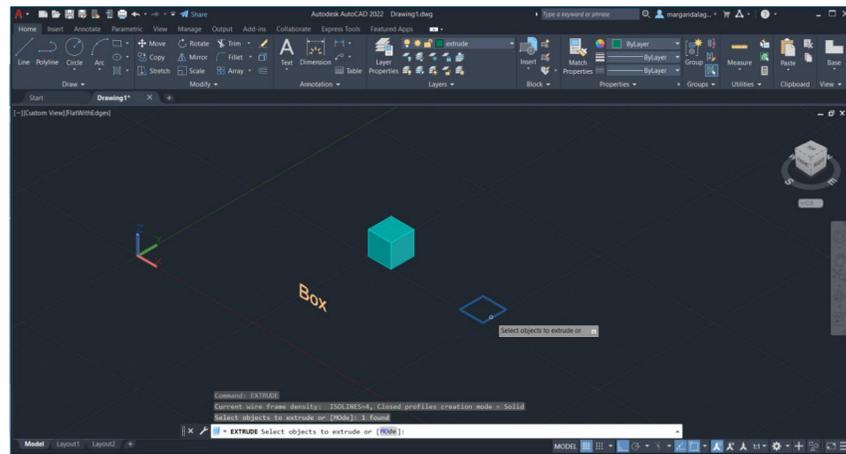


3. Criação de layers e de seguida, mover o cubo criado para a layer box

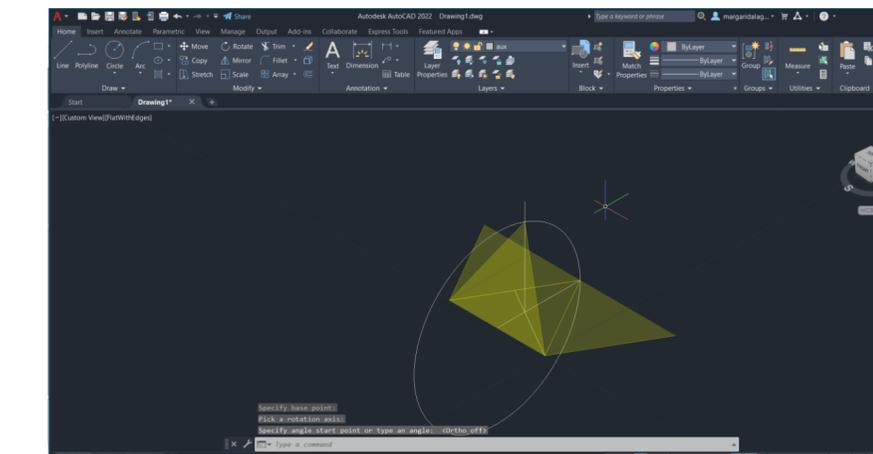
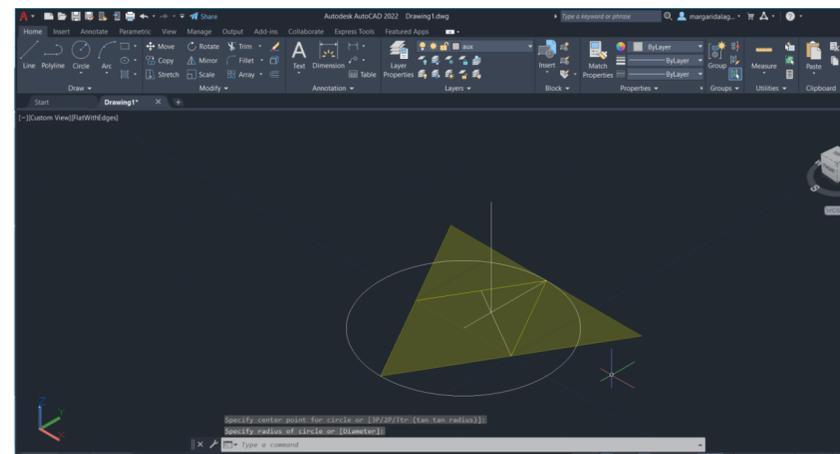
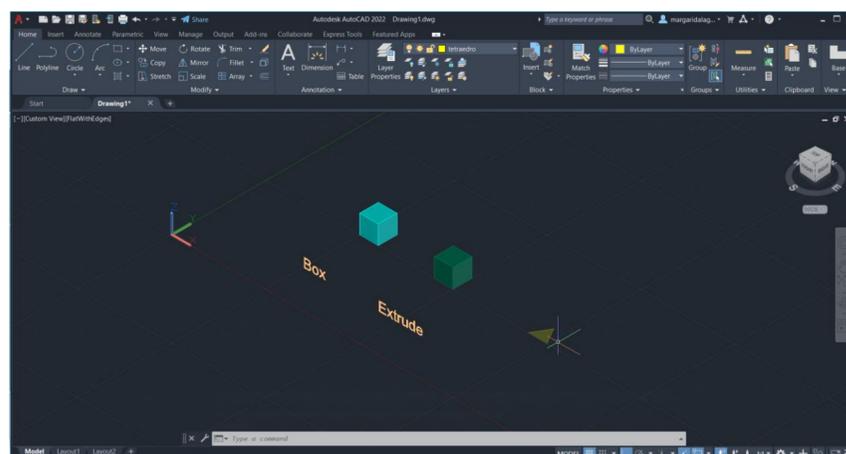


4. Na layer texto, utilizar o comando **text** para adicionar os nomes das figuras criadas e de seguida com o auxílio do comando **3drotate**, rodar as letras

Exerc. 2.1 – Box

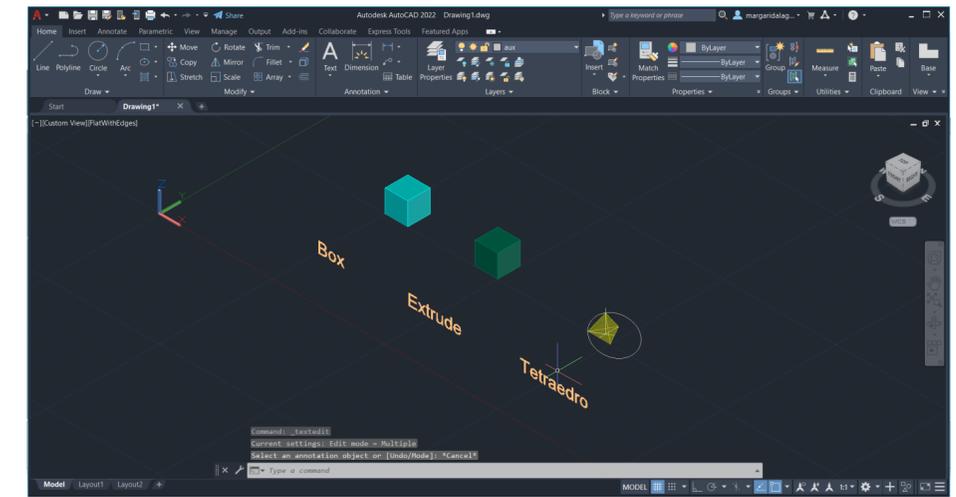
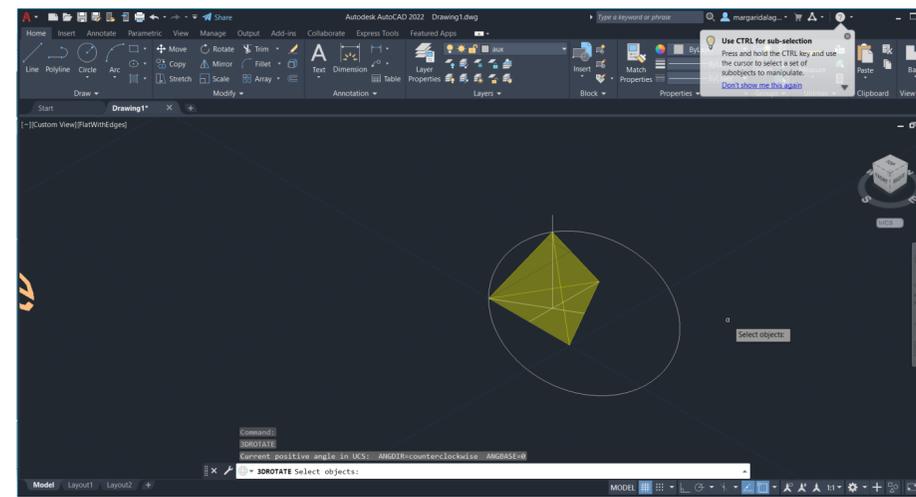
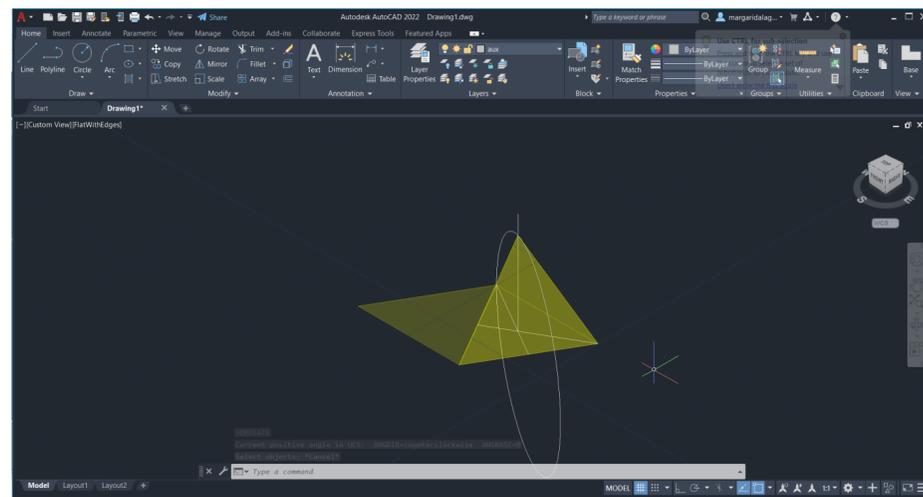


5. Na layer **extrude**, utilizar o comando **extrude** para concluir o novo cubo criado

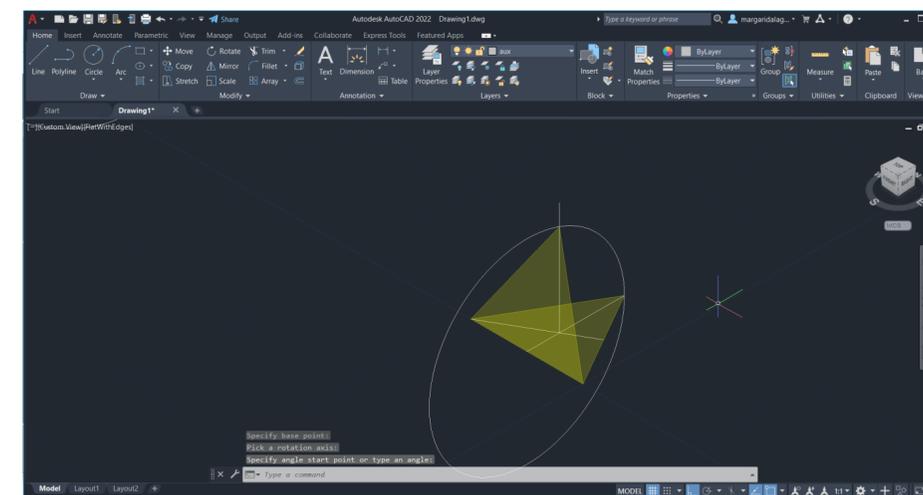
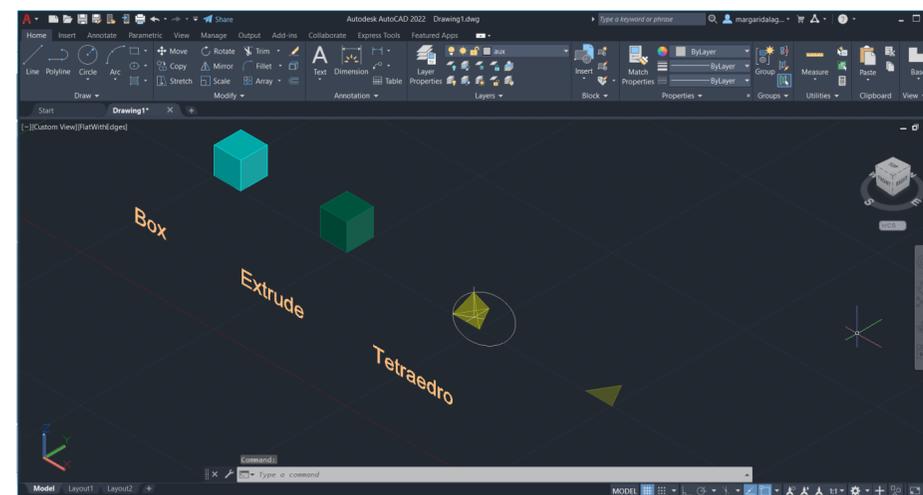


6. Na layer **texto**, utilizar o comando **text** para adicionar os nomes das figuras criadas e na layer **tetraedro** planificar o tetraedro. De seguida, iniciar o processo de rebatimento das faces do tetraedro, com o auxílio do comando **3drotate**

Exerc. 2.2 e 2.3 – Extrude e Tetraedro

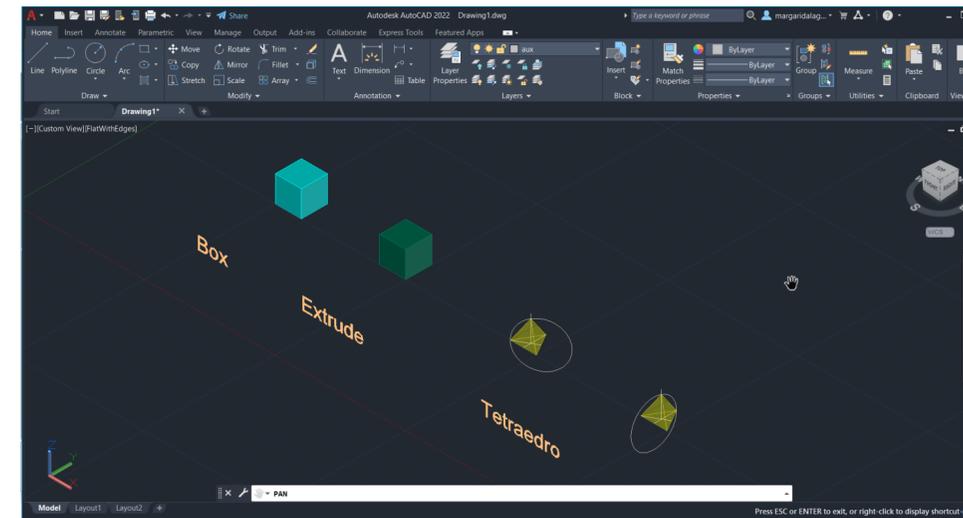
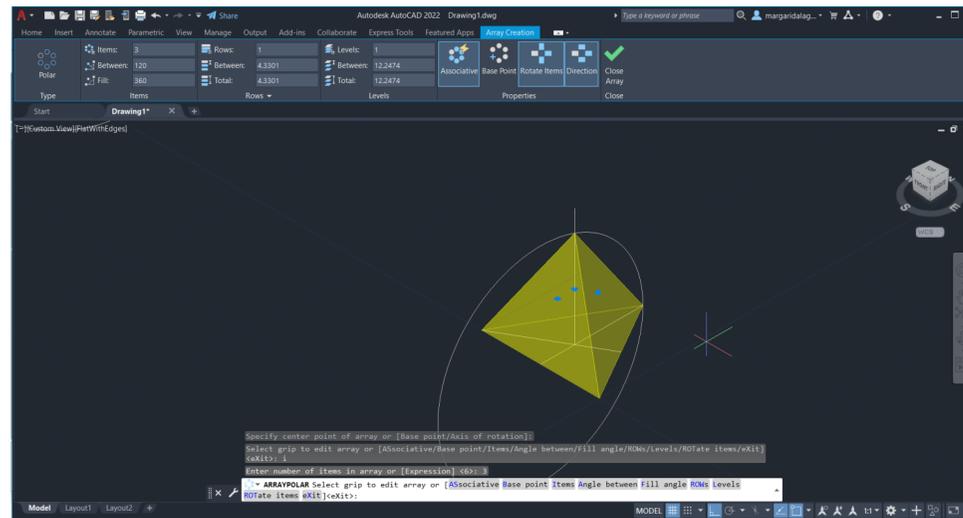


7. Continuação do rebatimento das faces do tetraedro e conclusão do mesmo

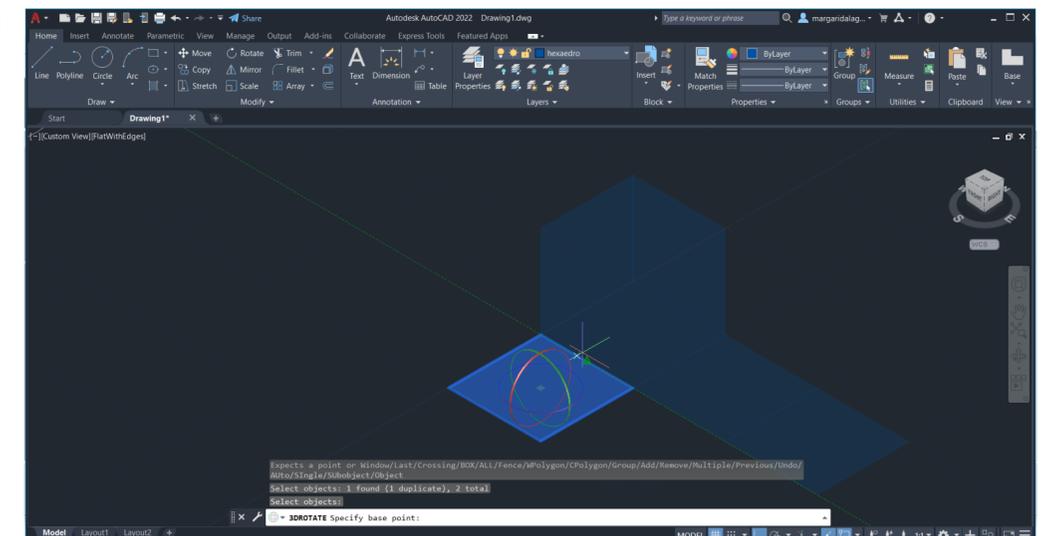
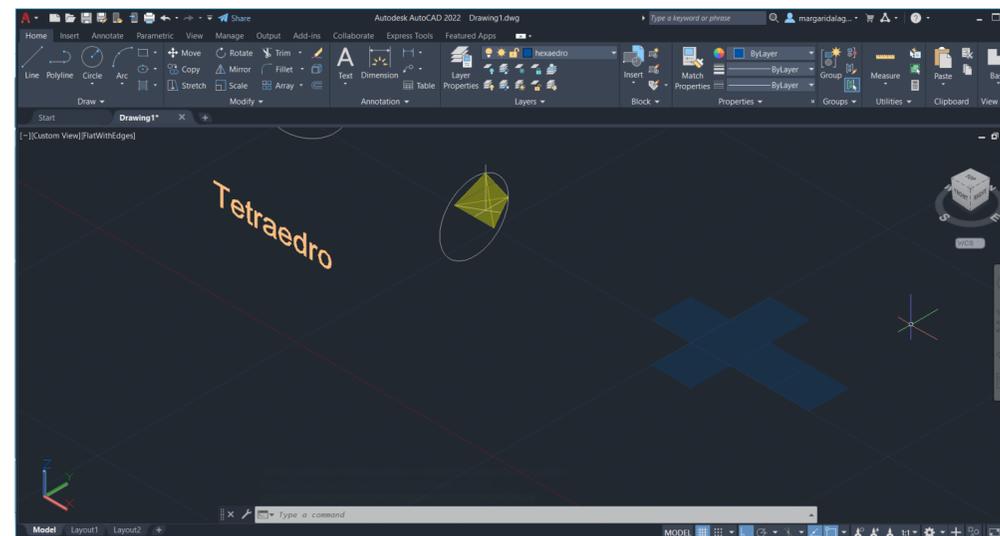
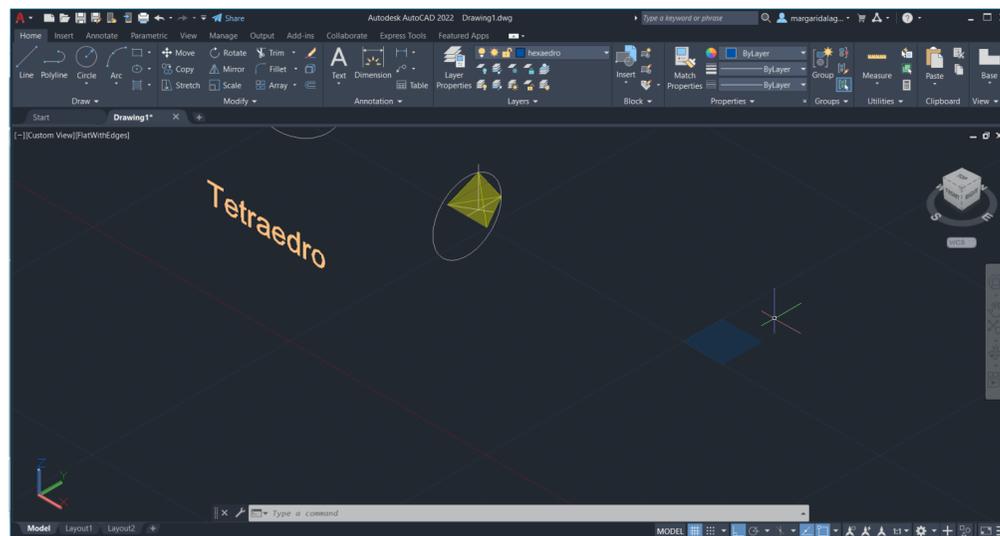


8. Na layer **tetraedro** planificar o tetraedro. De seguida, iniciar o processo de rebatimento das faces do tetraedro, com o auxilio do comando **3drotate**

Exerc. 2.2a – Tetraedro 2



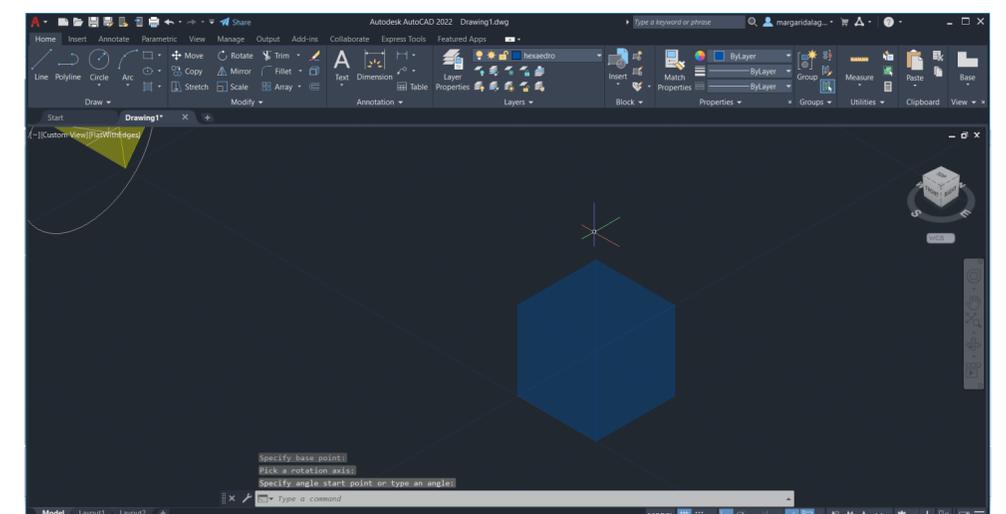
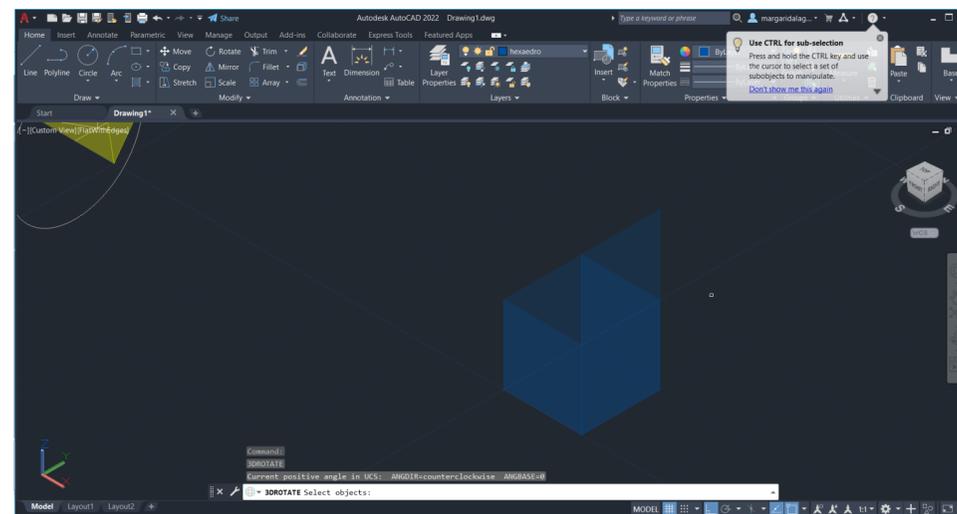
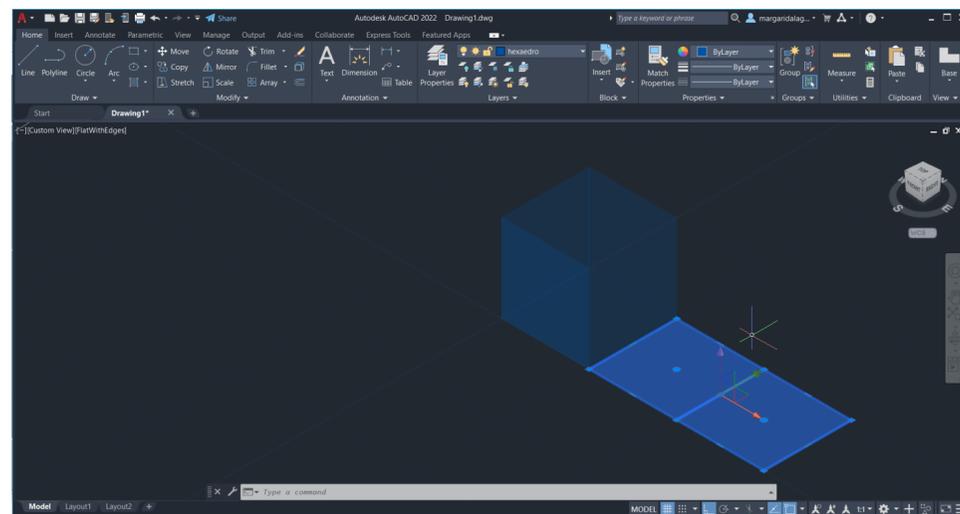
9. Continuação do rebatimento das faces do tetraedro e conclusão do mesmo



10. Na layer **hexaedro**, primeiro inserir a planificação de um cubo através de quadrados e para terminar, com o comando **3drotate** rebater todos as faces de modo a obter um cubo

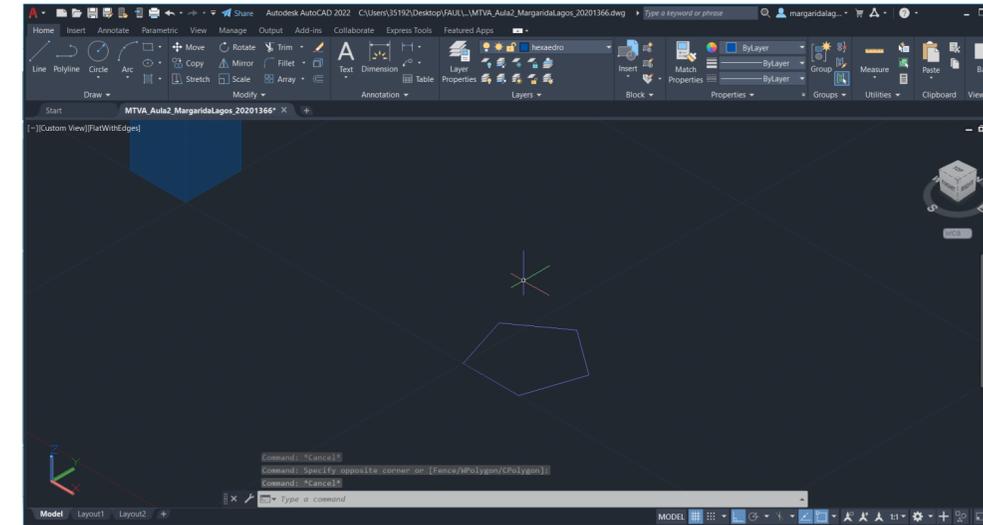
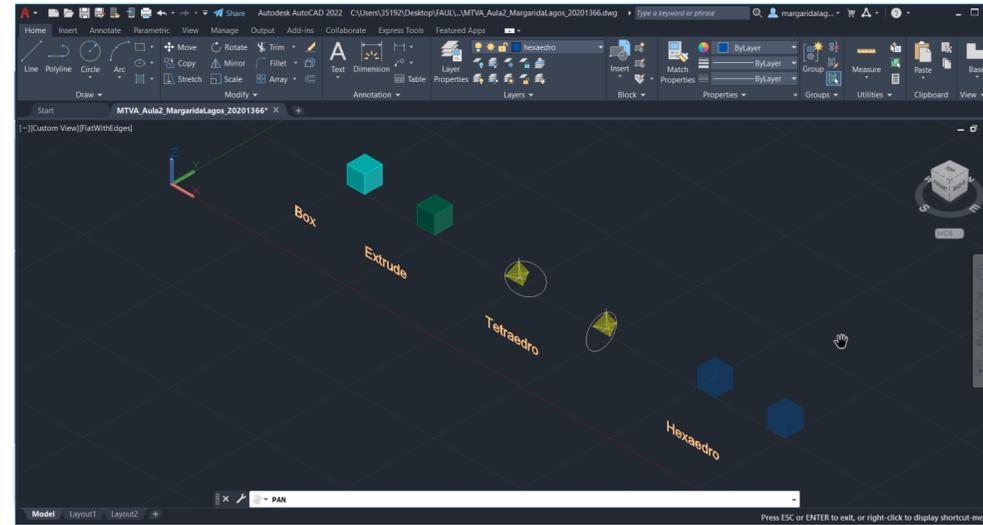
Exerc. 2.3 – Hexaedro

Capturas de ecrã tiradas no decorrer da aula

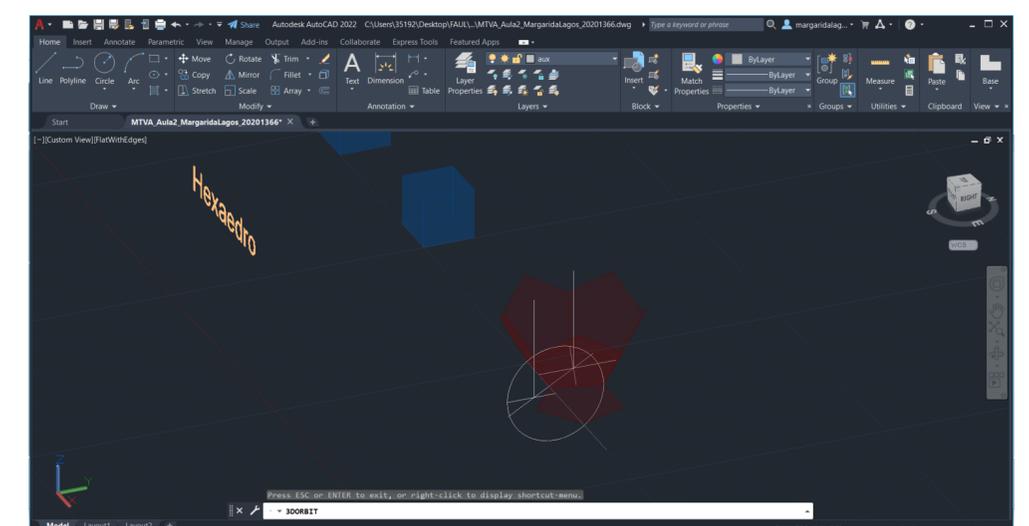
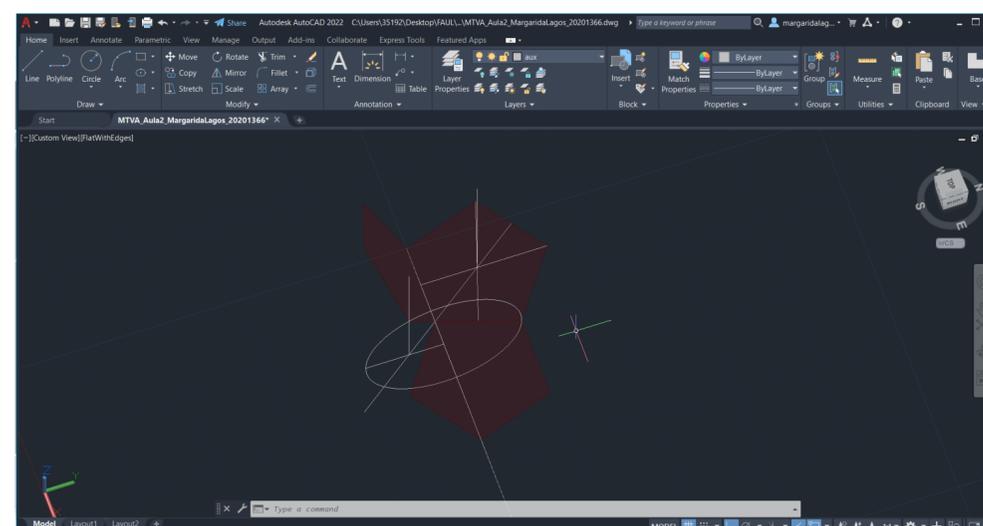
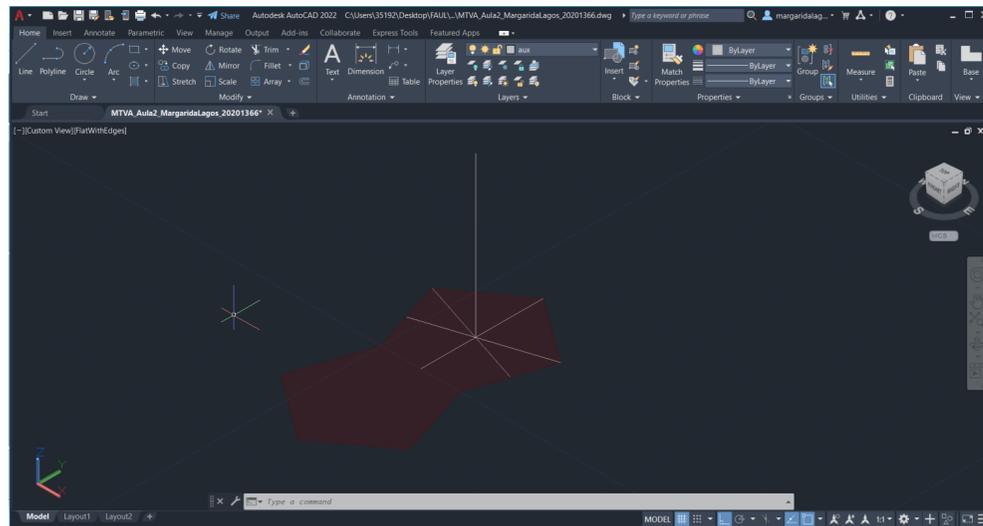


11. Conclusão do cubo

Exerc. 2.3 – Hexaedro



13. Conclusão do exercício



14. Resolução do t.p.c

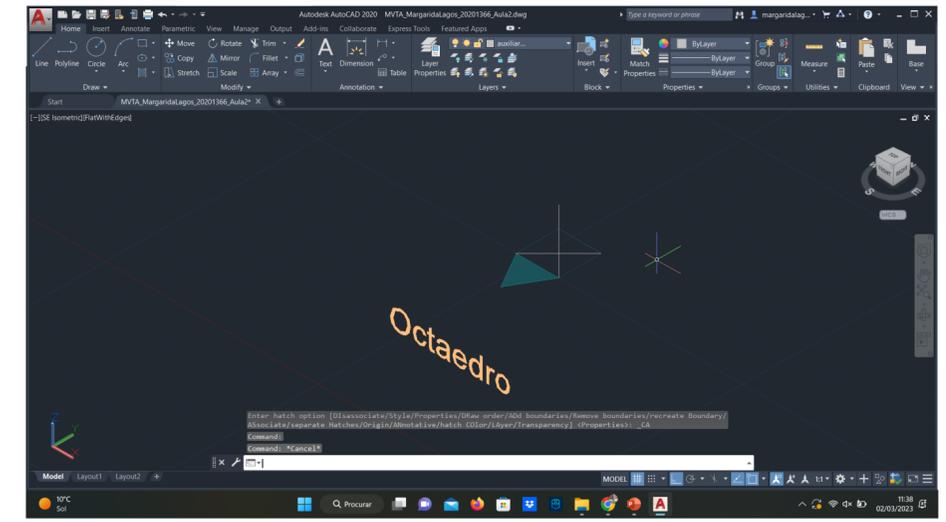
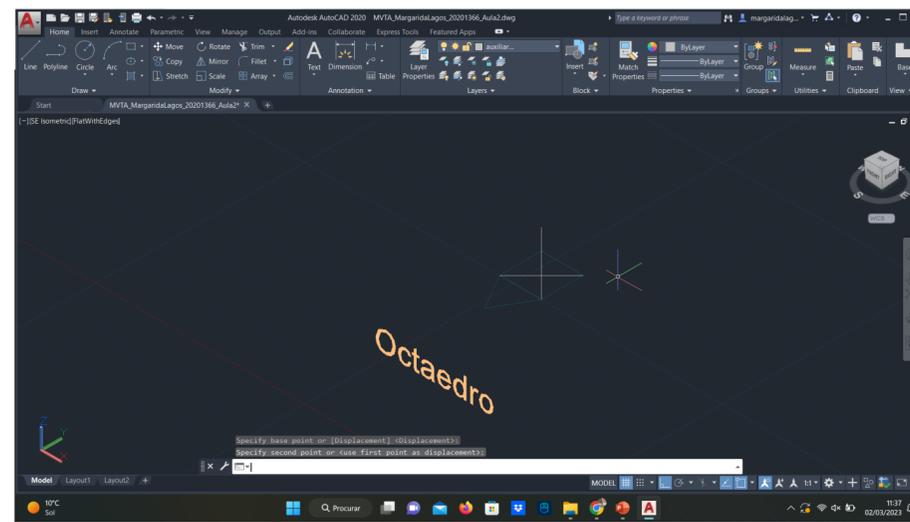
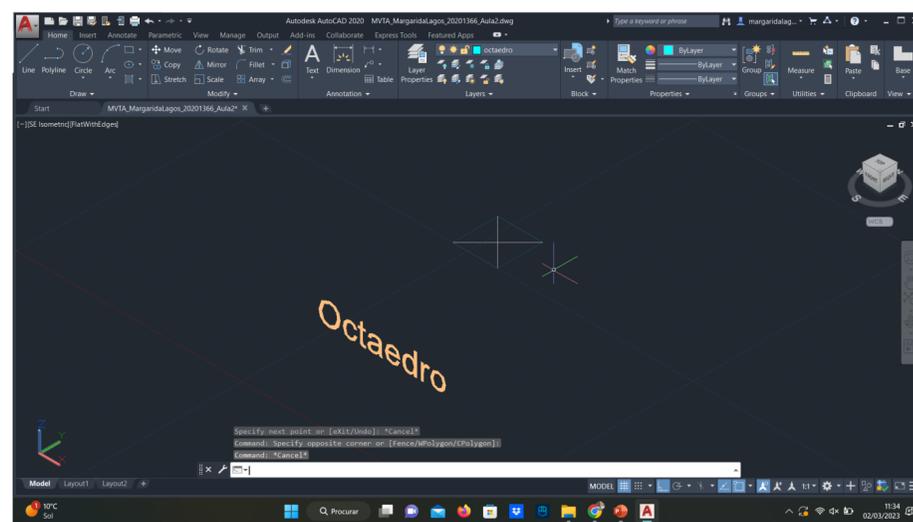
Exerc. 2.4 – Dodecaedro (t.p.c)

3ª Aula - 2 de março de 2023

Sumário

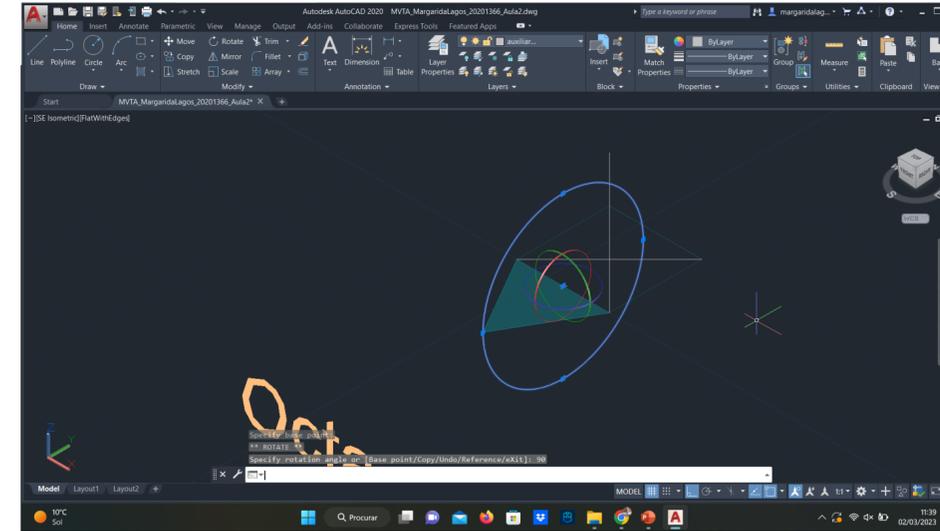
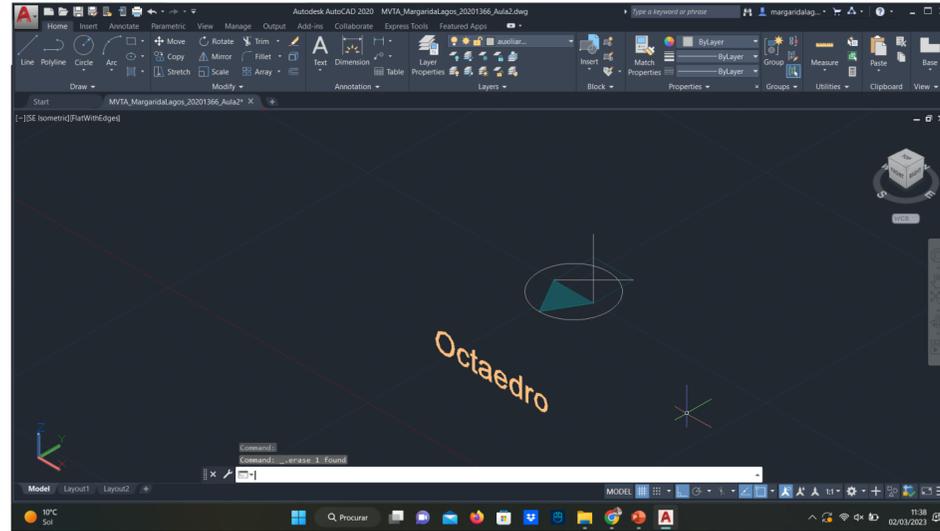
- Construção de um octaedro e icosaedro
- Resolução do decaedro (t.p.c)

Capturas de ecrã tiradas no decorrer da aula

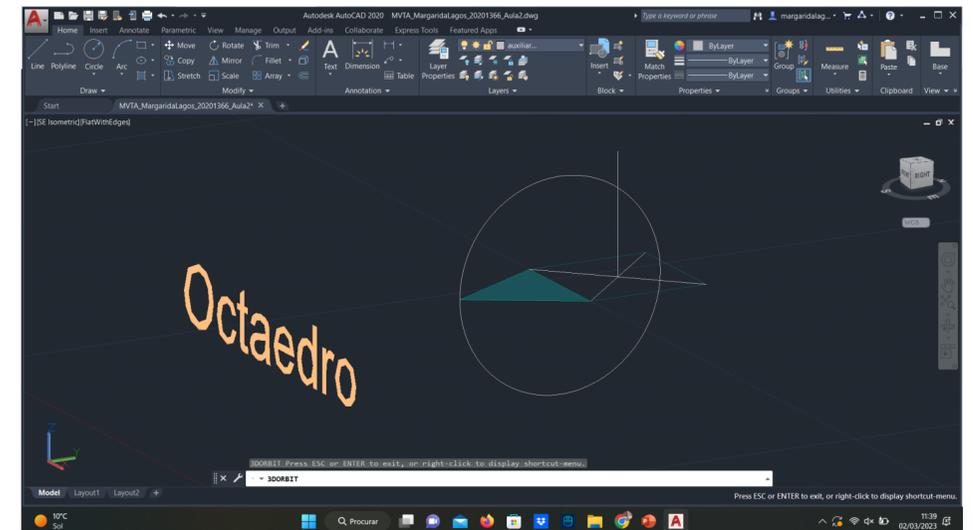
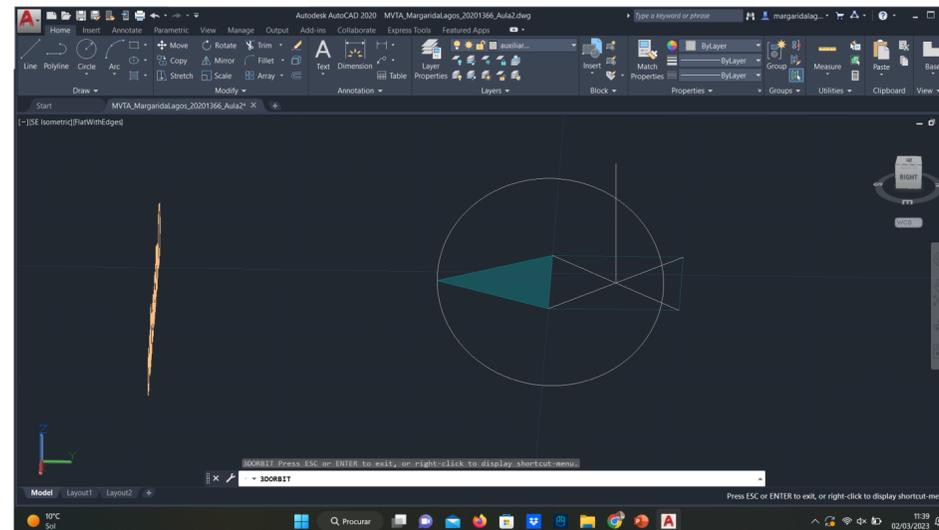
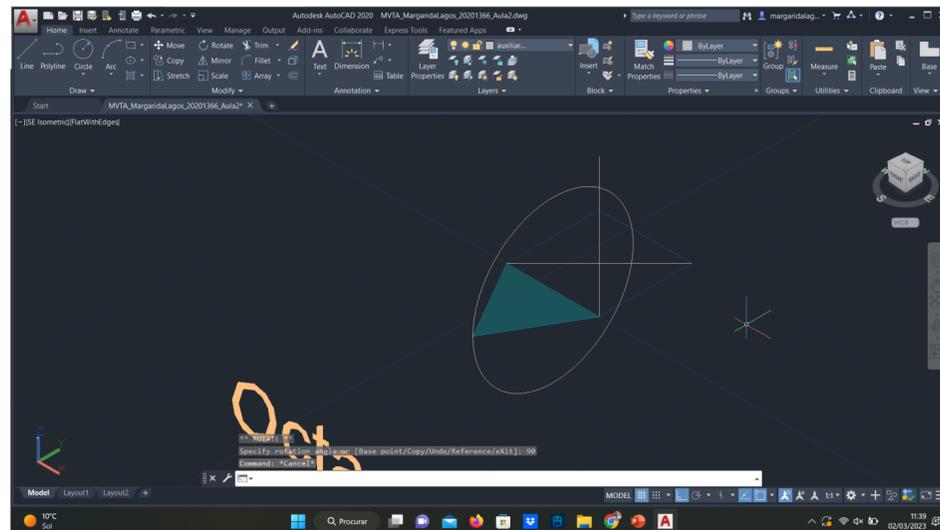


1. Criar um quadrado e encontrar o centro do mesmo através das diagonais e depois fazer a face do triangulo equilátero

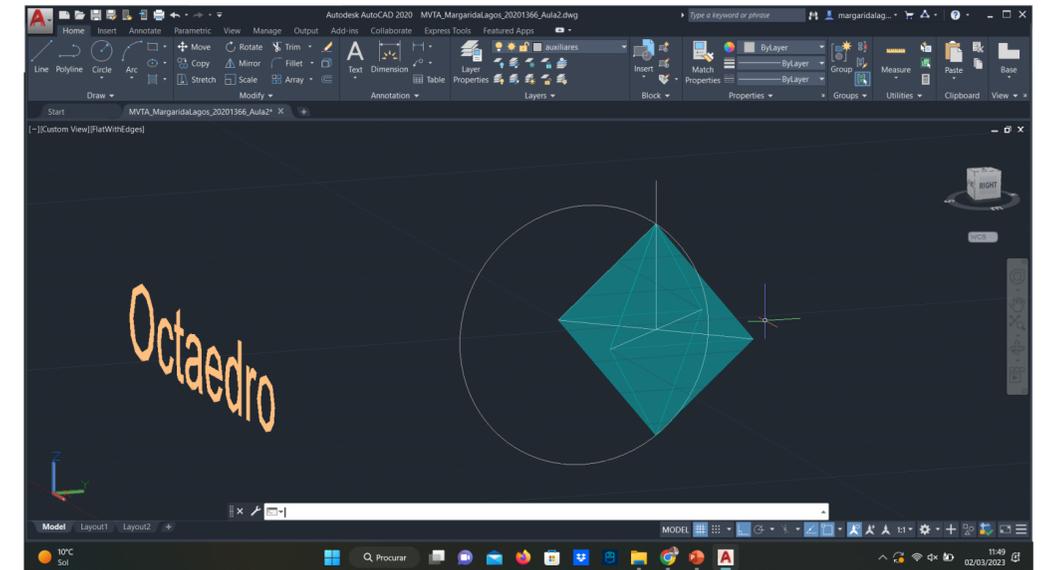
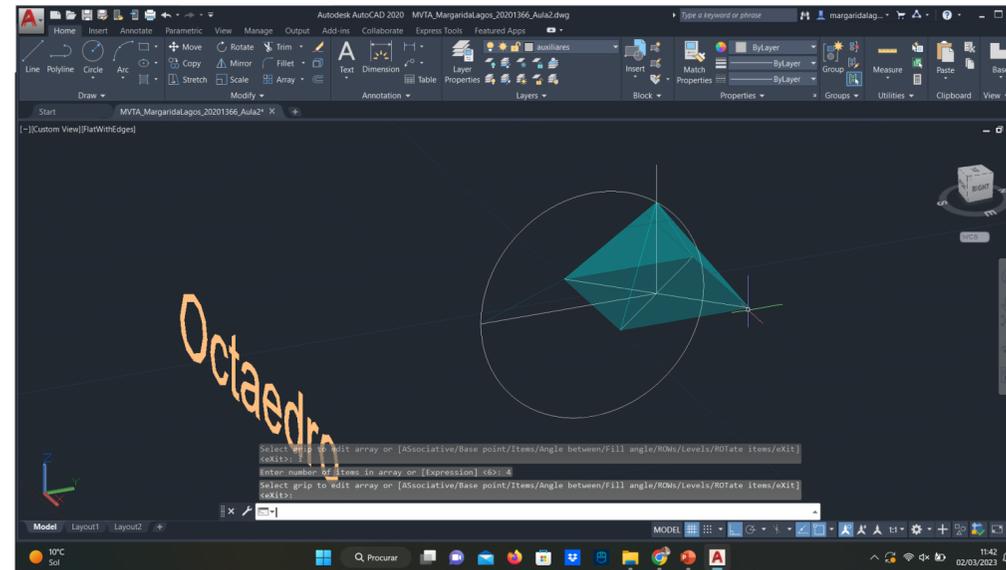
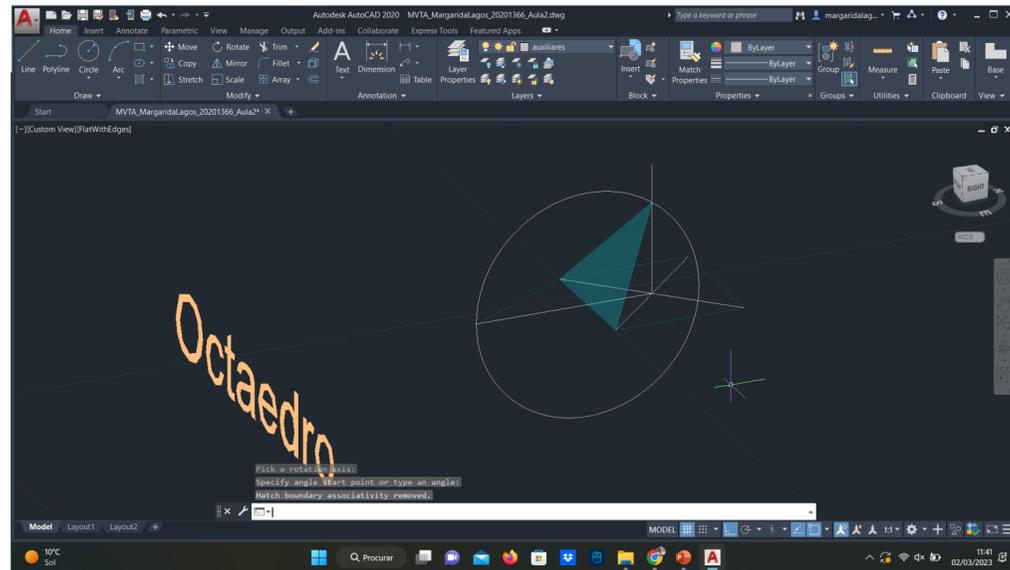
Exerc. 3.1- Octaedro



2. De seguida, rebater a face criada anteriormente com o comando **3drotate**

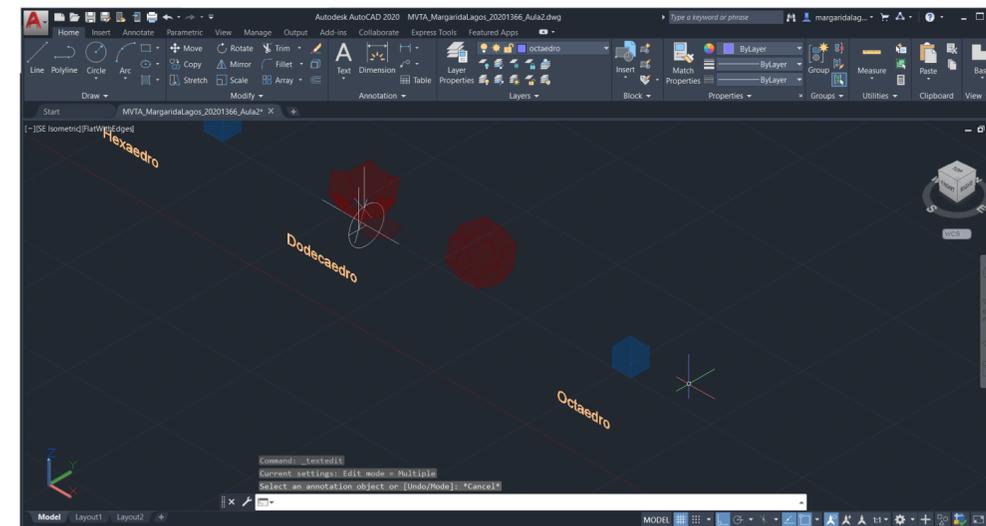
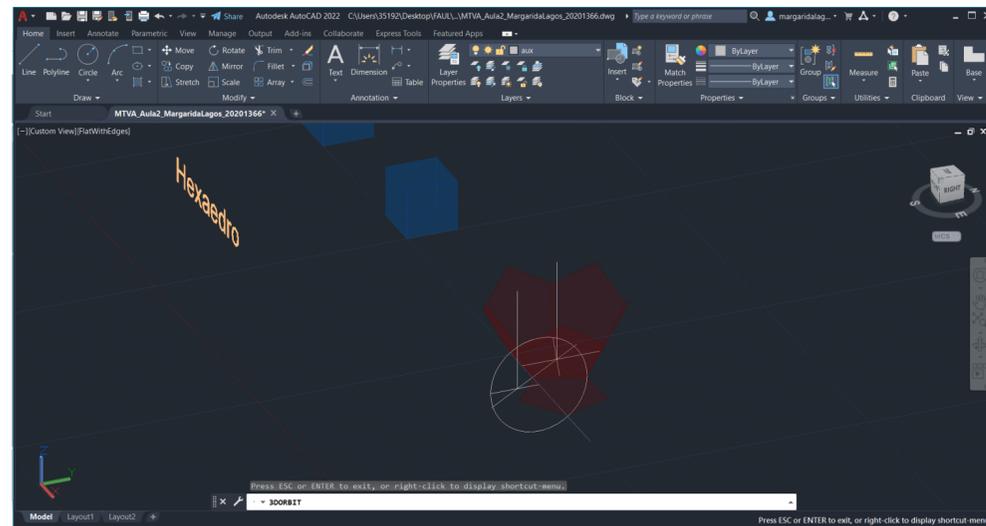
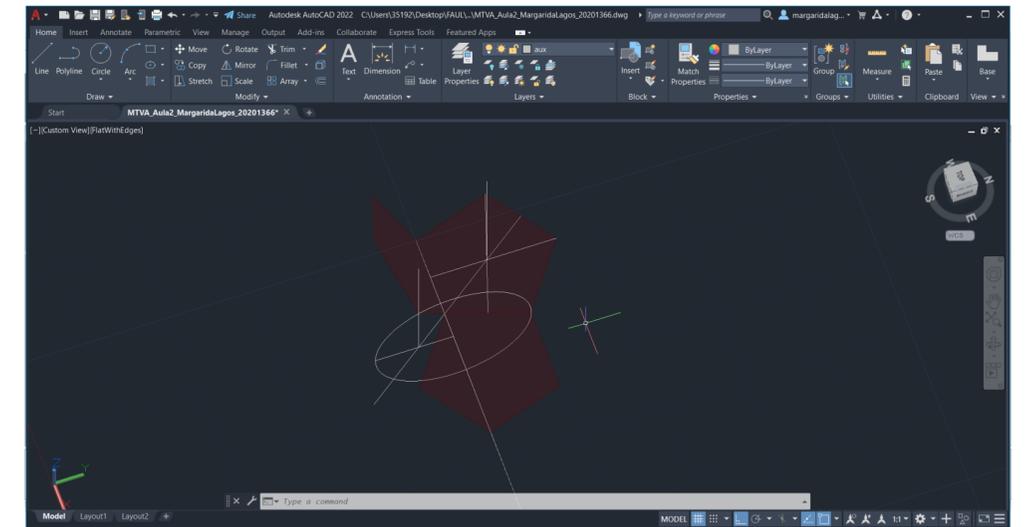
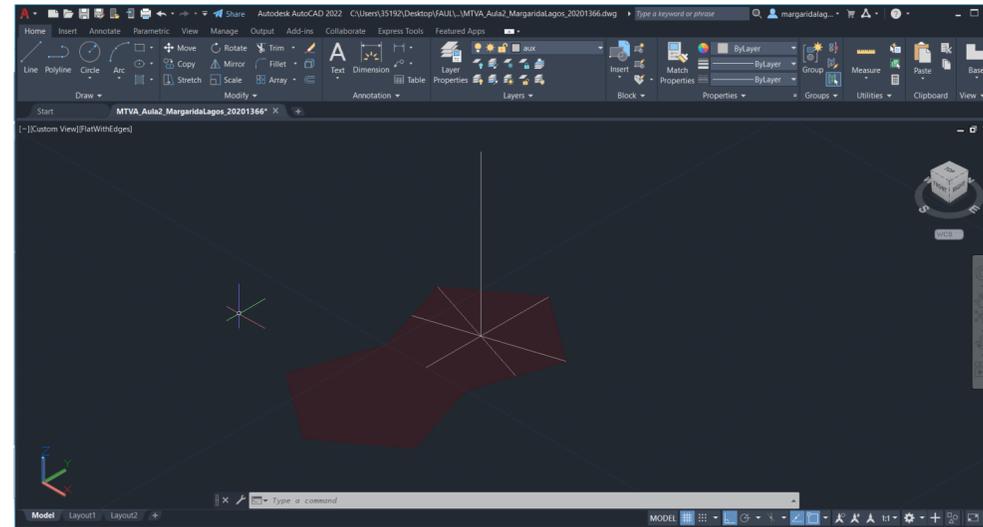
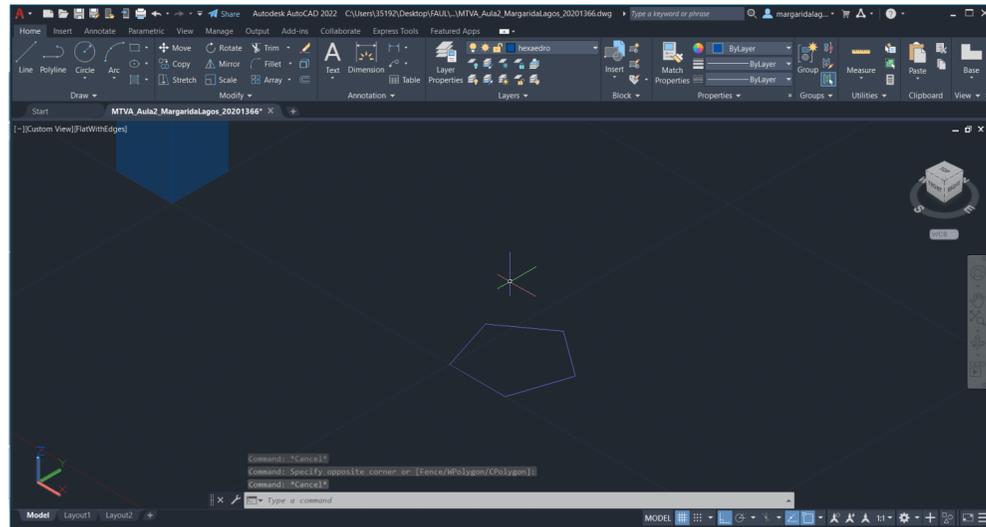


Exerc. 3.1 – Octaedro



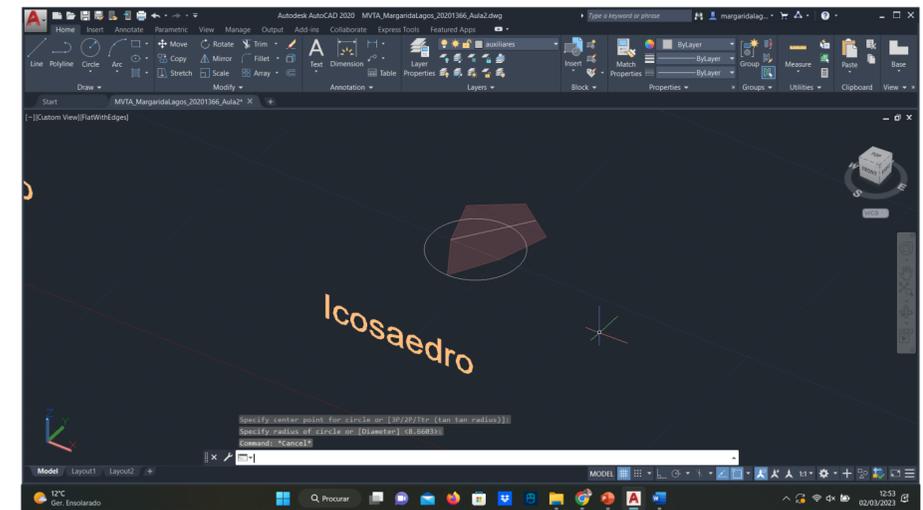
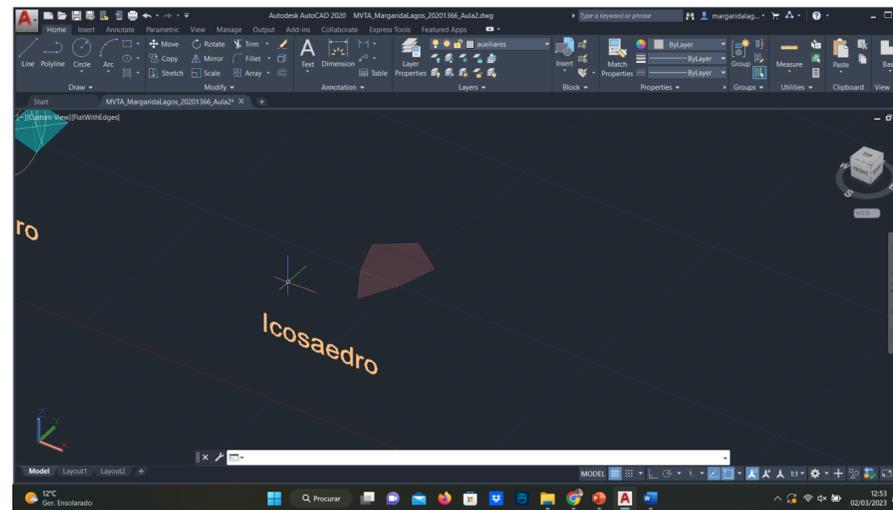
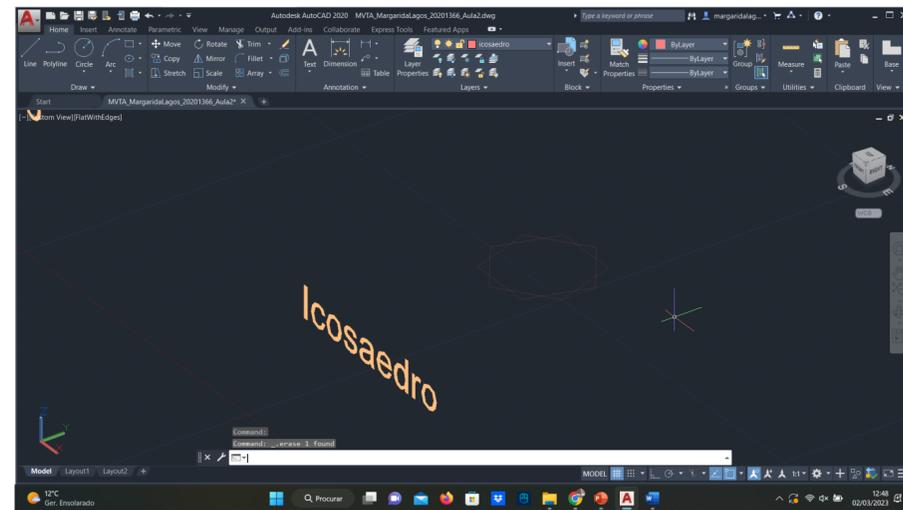
4. Utilizar o comando **array polar**, **i, 4** e utilizar o comando **3dmirror**. Conclusão do exercício

Exerc. 3.1 – Octaedro

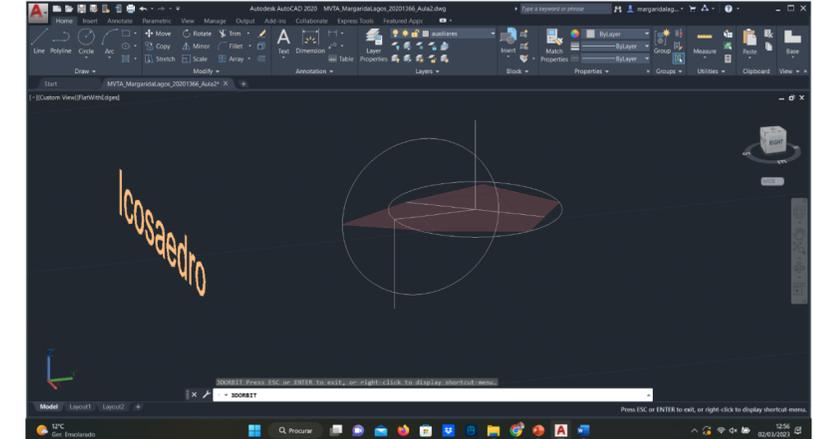
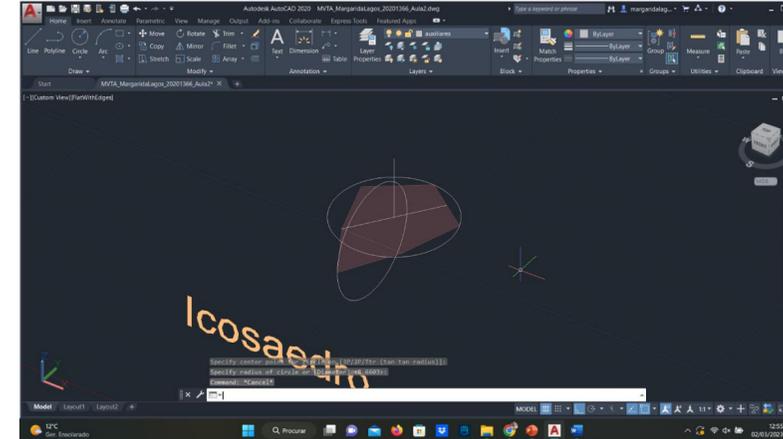
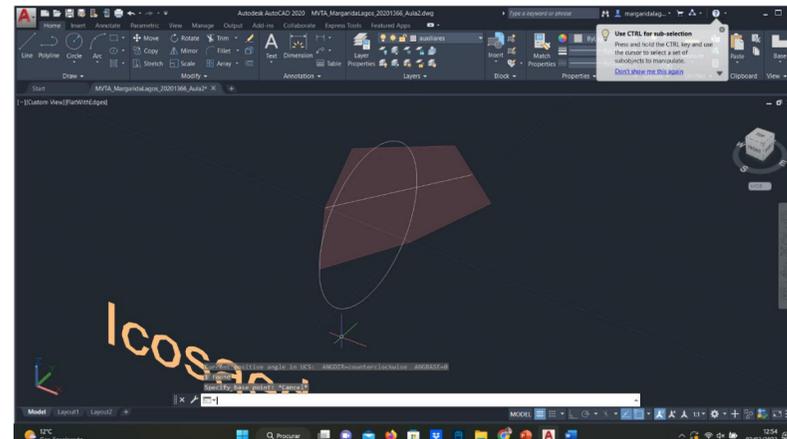
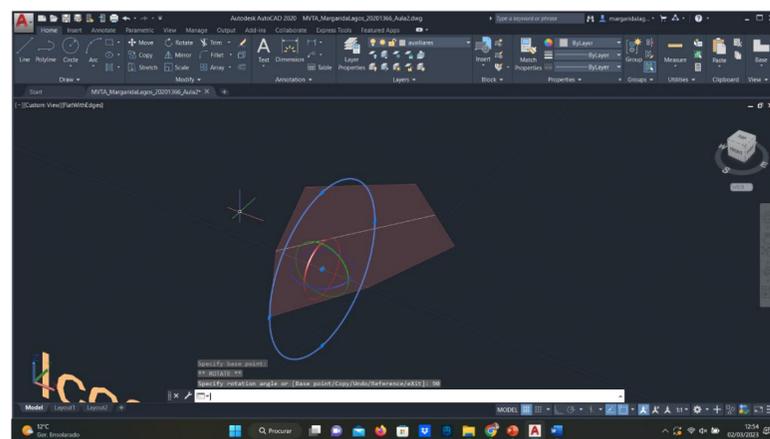


5. Já tinha feito o t.p.c.

Exerc. 3.2 – Dodecaedro (resolução tpc)

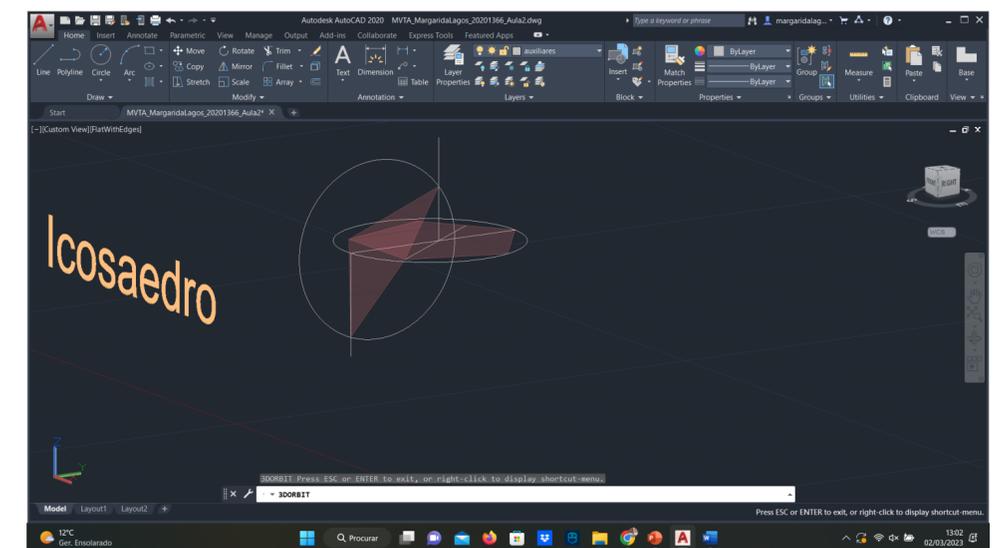
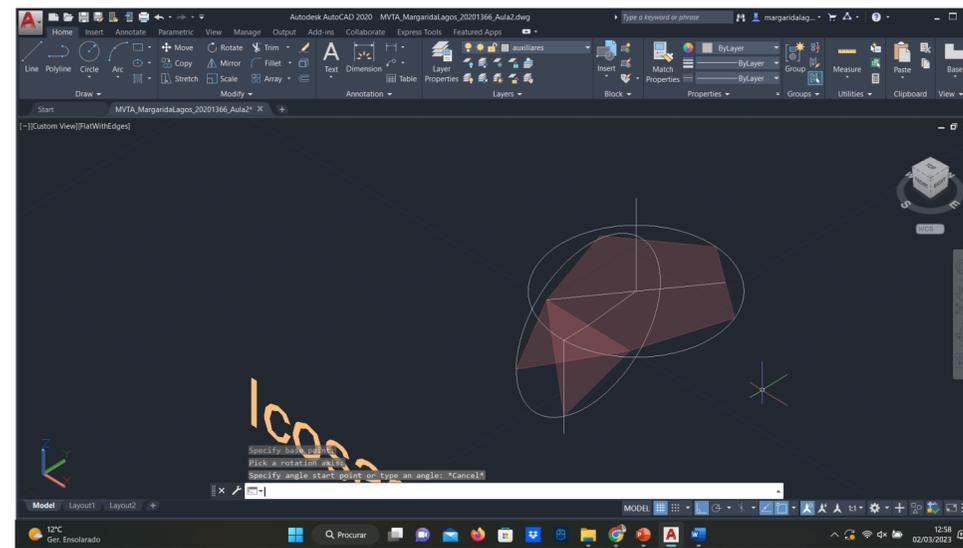
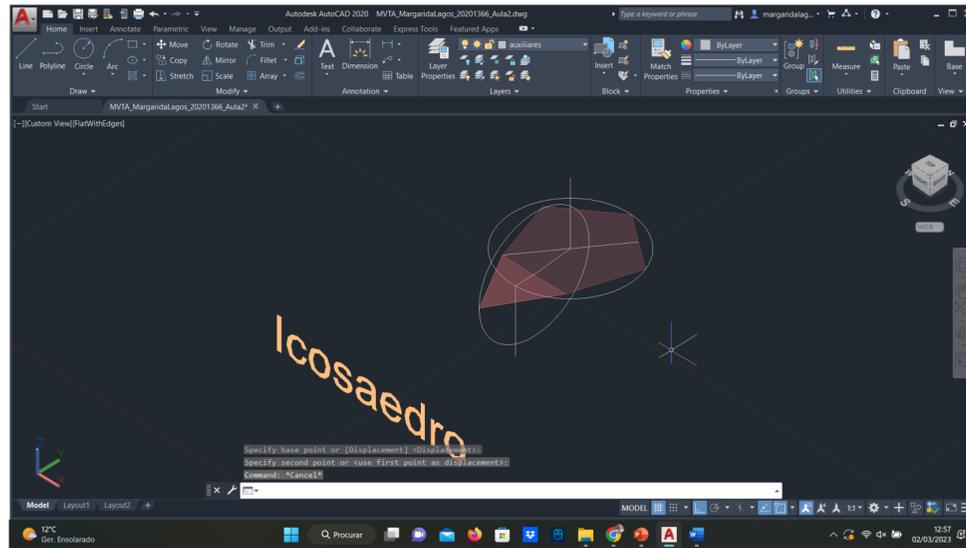


6. Criar um pentágono e de seguida, um triângulo equilátero

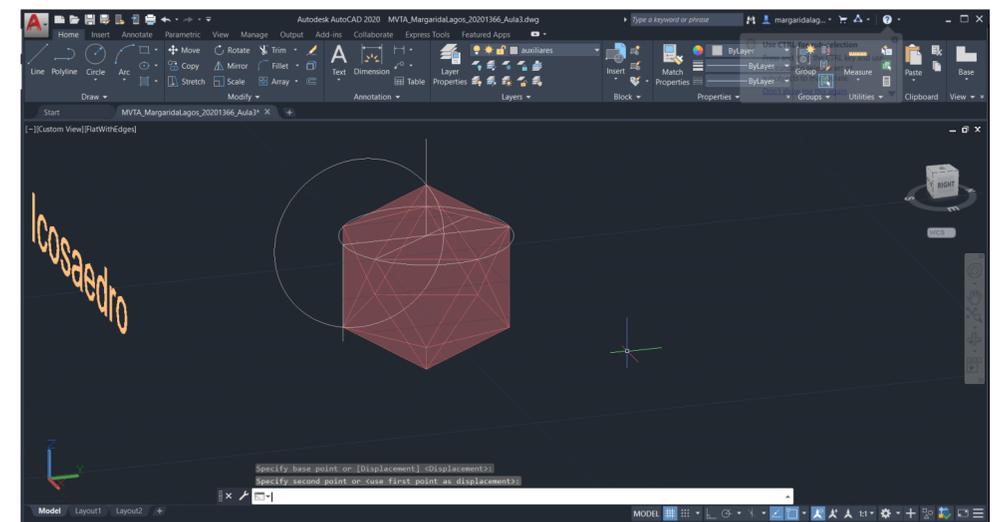
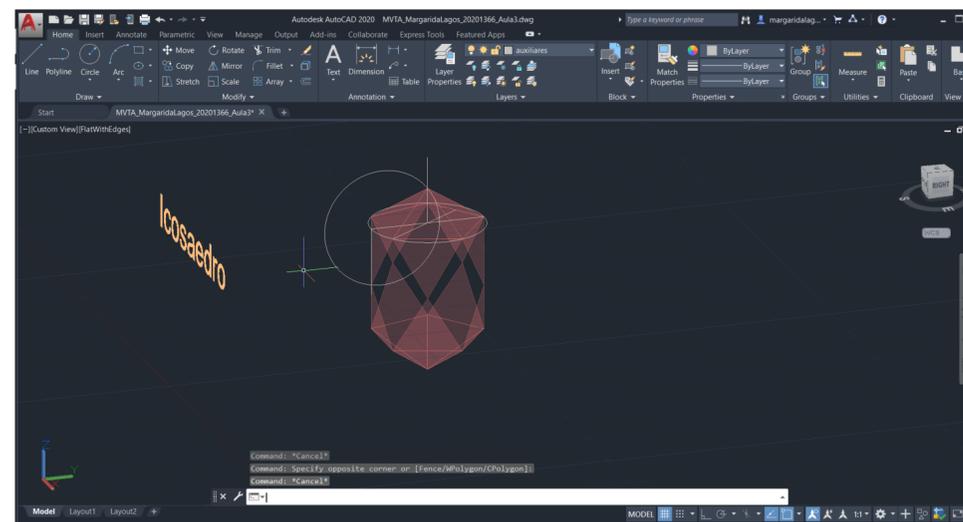
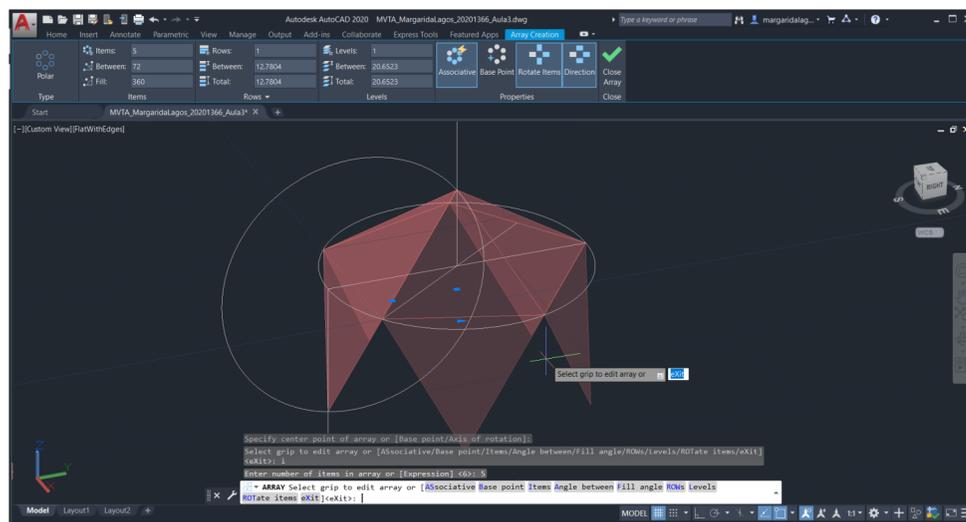


7. Rebater utilizando o comando **3drotate**

Exerc. 3.3 – Icosaedro

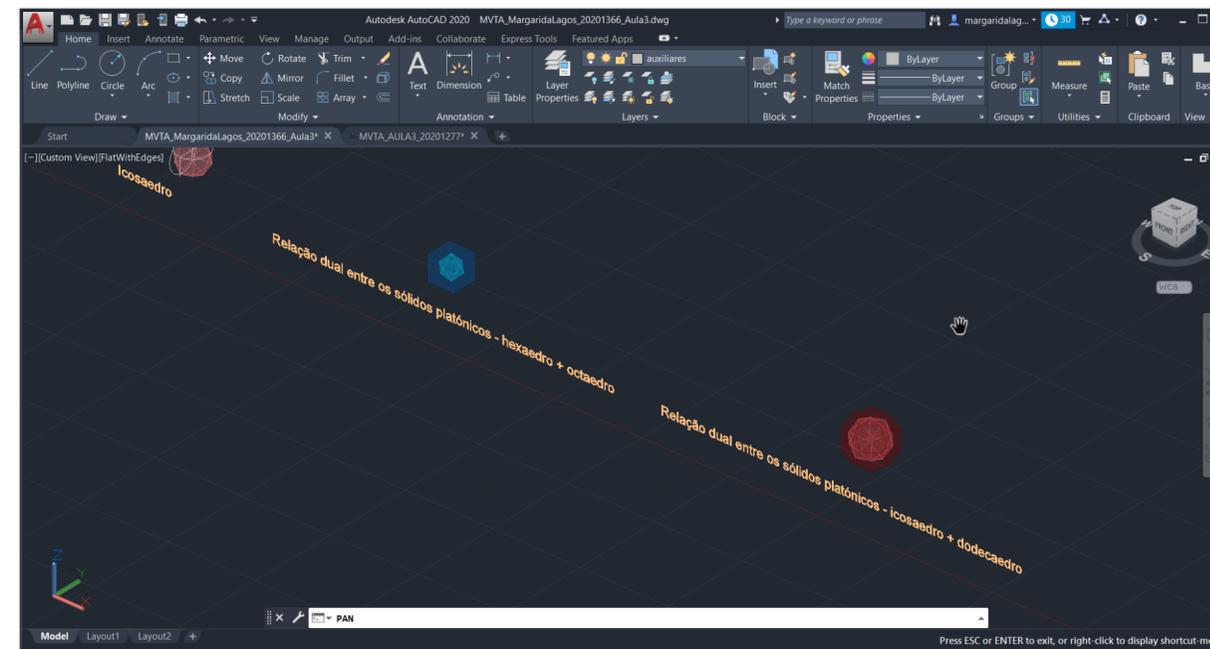
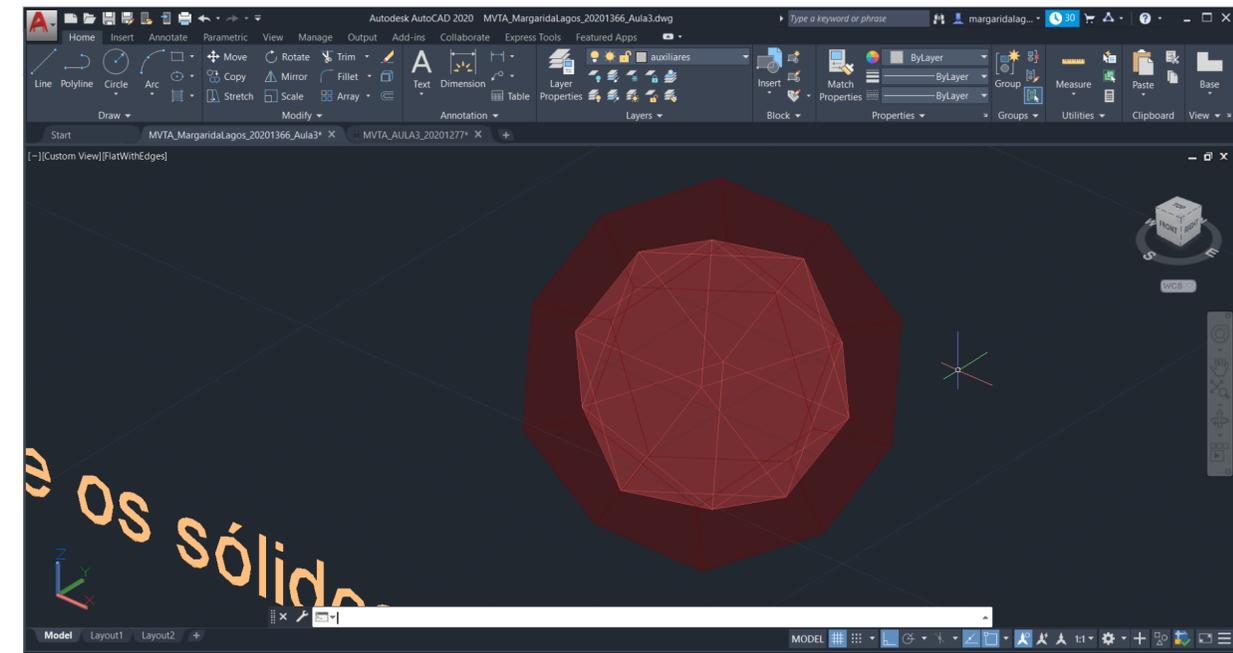
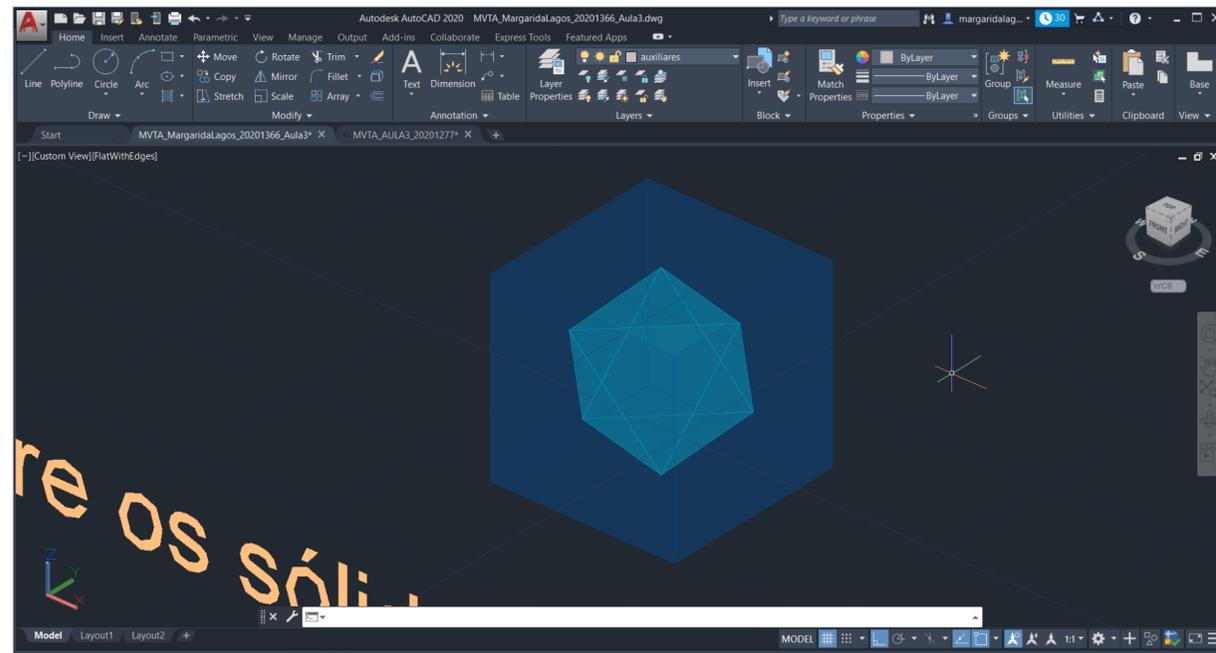


8. Utilizar o comando **copy** para duplicar a face triangular e rebater uma destas para baixo a 90° e a outra face para a interseção do círculo auxiliar anteriormente criado com a linha auxiliar que parte do centro da base pentagonal



9. Utilizar o comando **array polar** para fazer a rotação das faces criadas e seguidamente, o comando **3dmirror** (selecionando os 3 pontos da base) e fazer **rotate** de 36° e juntar. Conclusão do exercício

Exerc. 3.3 – Icosaedro



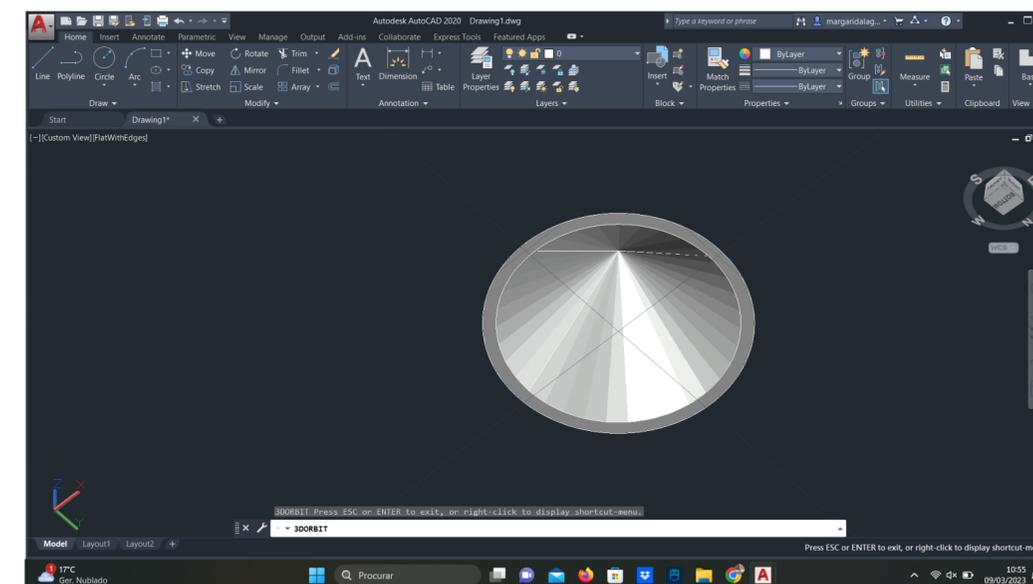
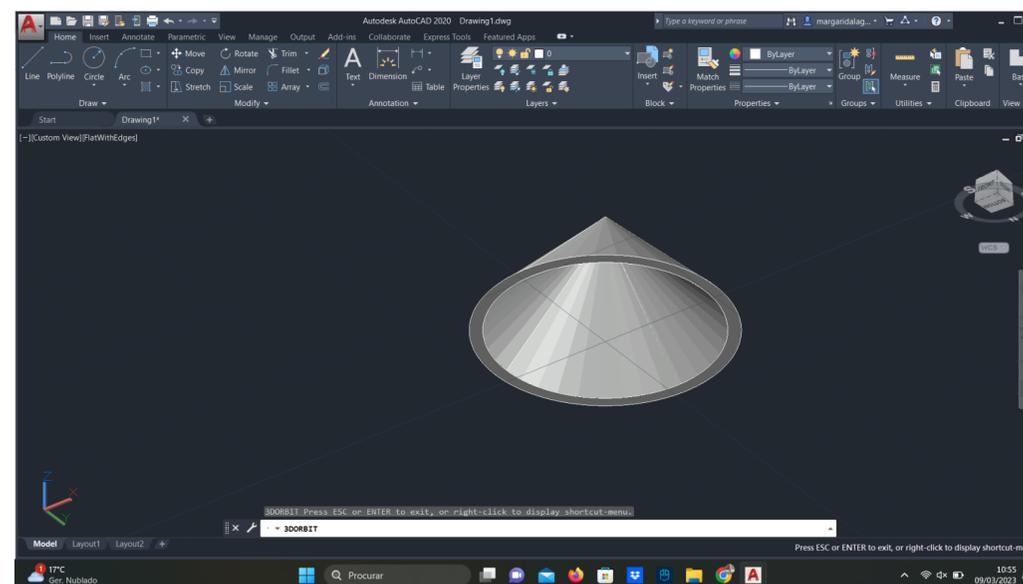
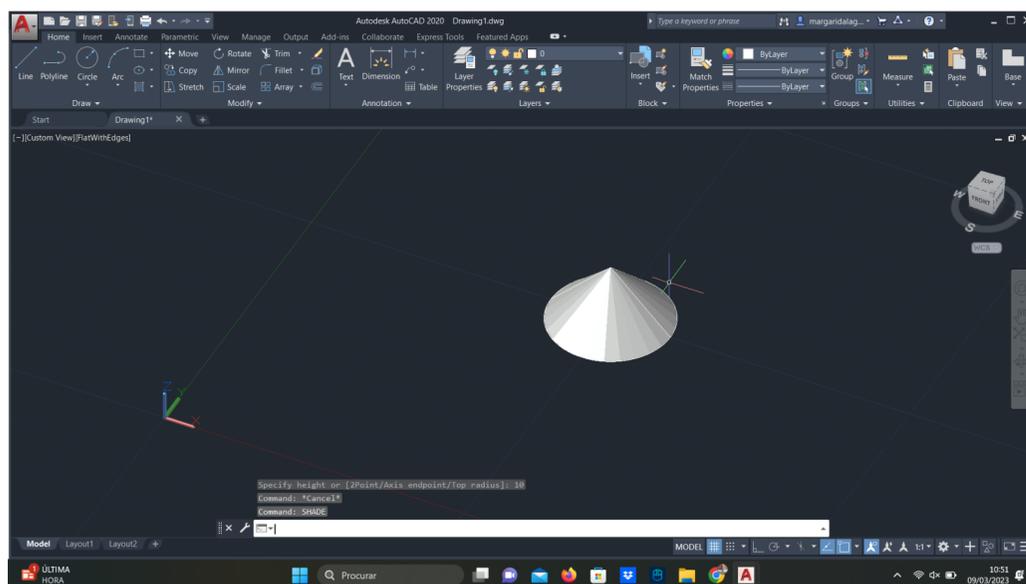
Exerc. 3.4 – Relação dual entre sólidos platónicos

4ª Aula - 9 de março de 2023

Sumário

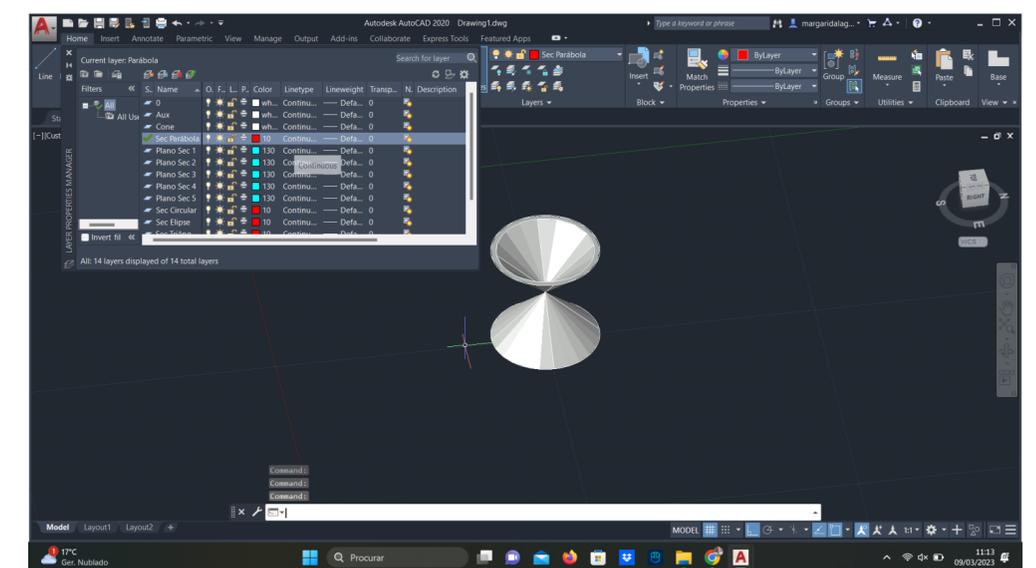
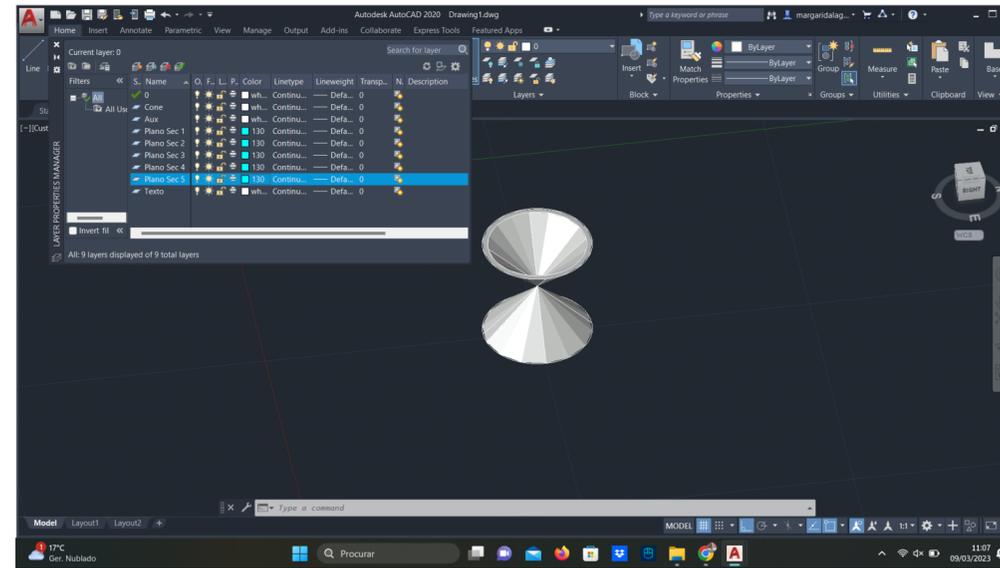
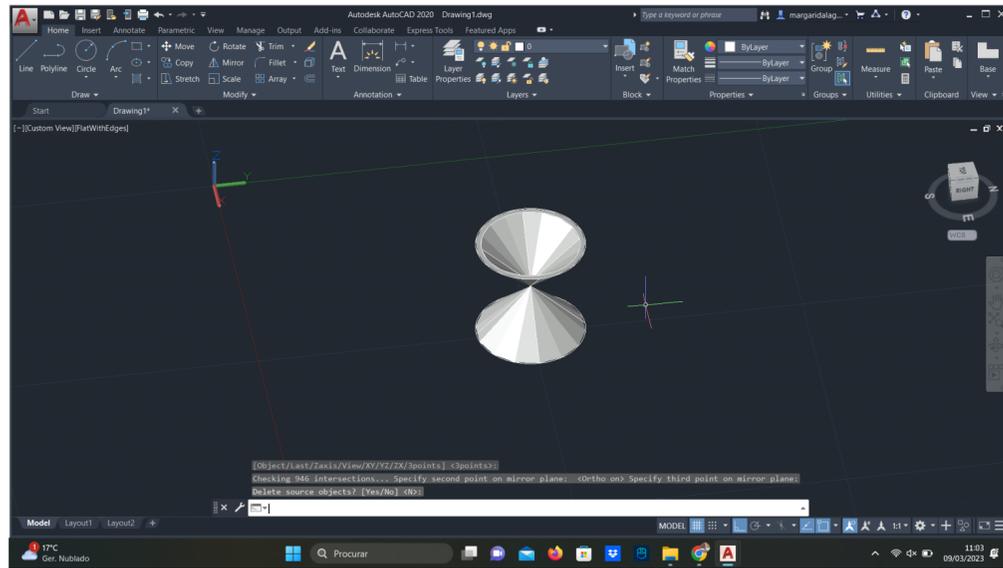
- Secções planas de um cone, superfície esférica, superfície elíptica, superfície parabólica, superfície hiperbólica e geratrizes

Capturas de ecrã tiradas no decorrer da aula

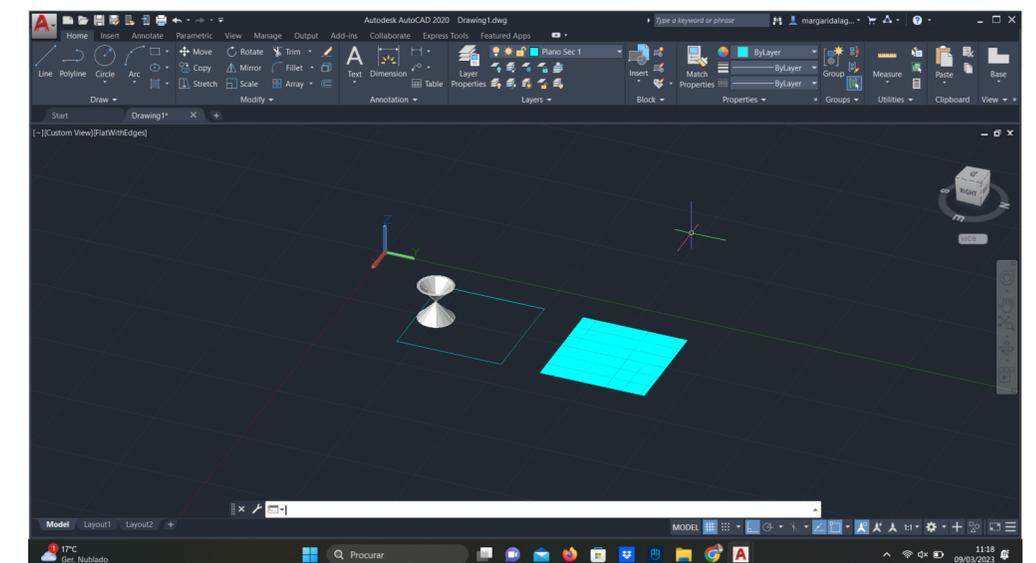
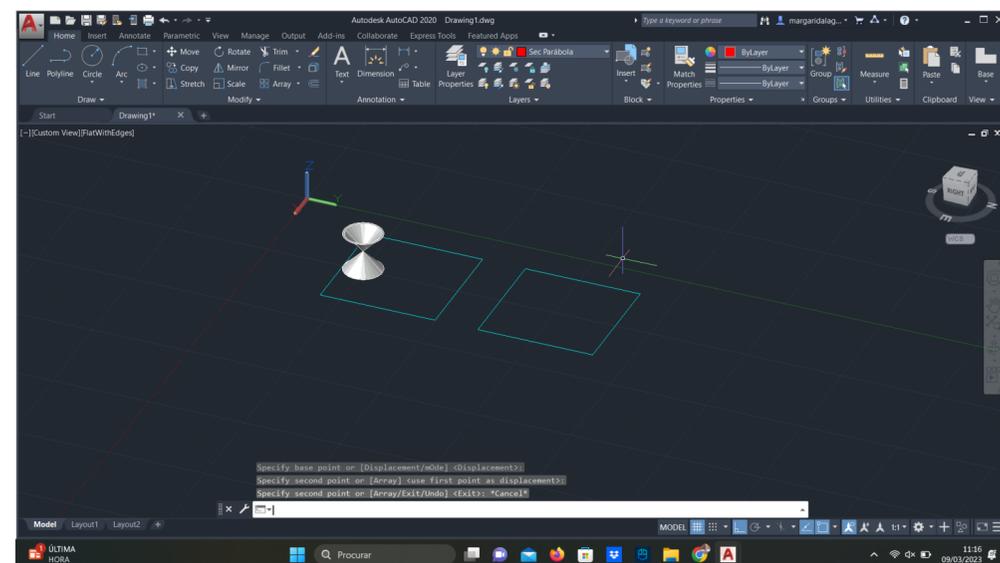
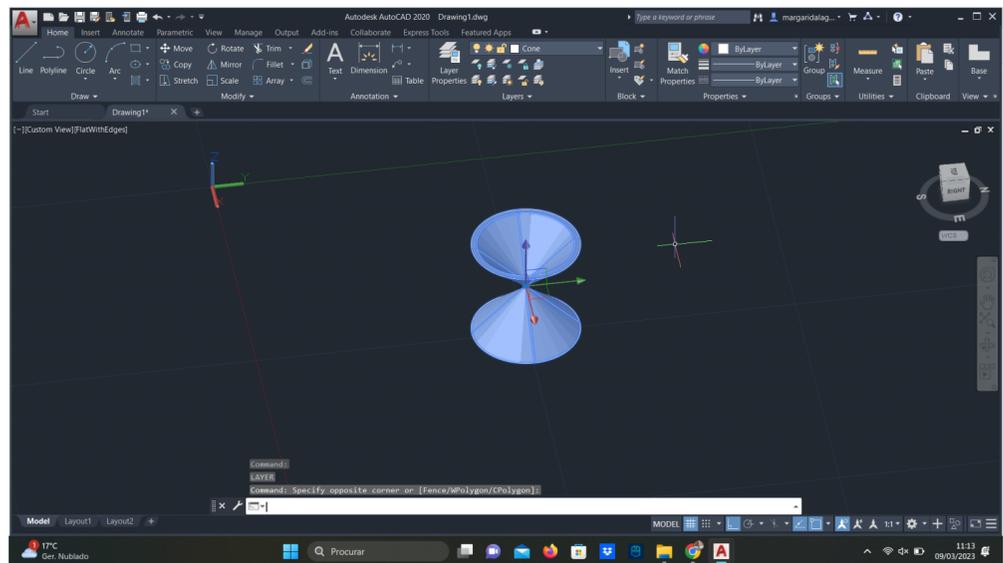


1. Criação de um cone com as coordenadas 50,50 com 10 de raio e novamente 10 mas de altura. Utilizar o comando **copy** para copiar um cone igual ao feito 1 unidade para cima e por fim, utilizar o comando **subtract**

Exerc. 4.1- Cone, superfície esférica, elíptica, parabólica, hiperbólica e geratrizes

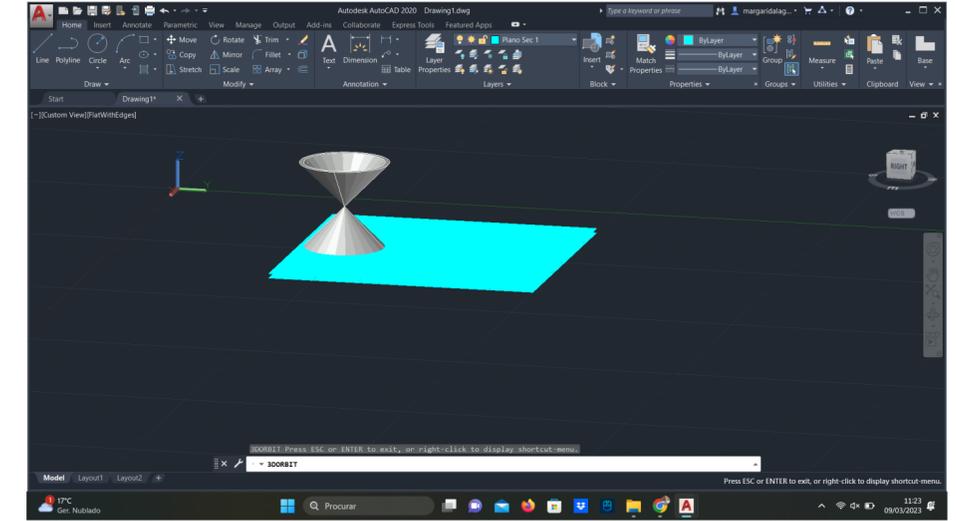
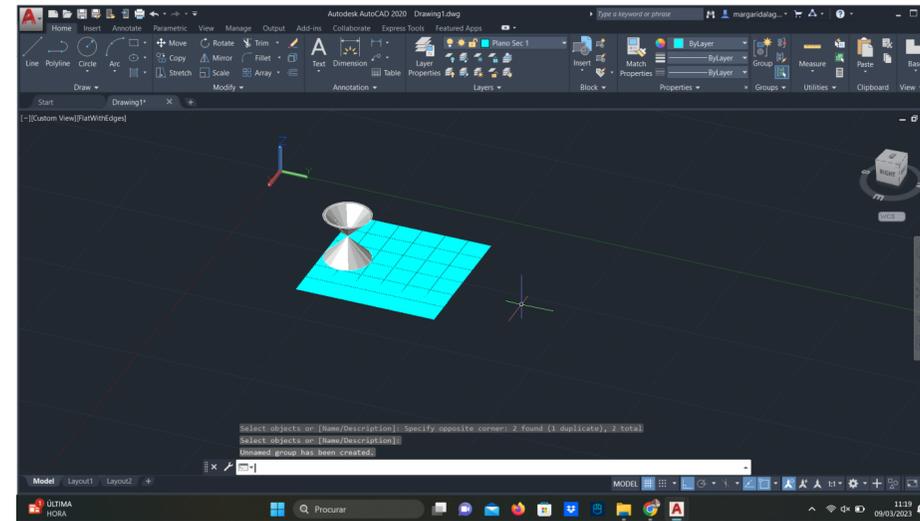
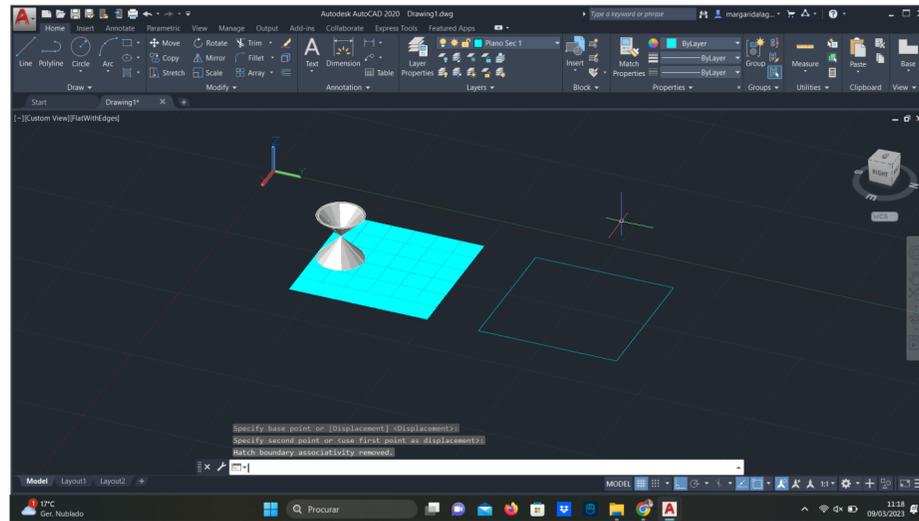


2. De seguida, utilizar o comando ***mirror3d*** e após selecionar os 3 pontos necessários, criar a ampulheta. Criação de novas layers para os planos secantes

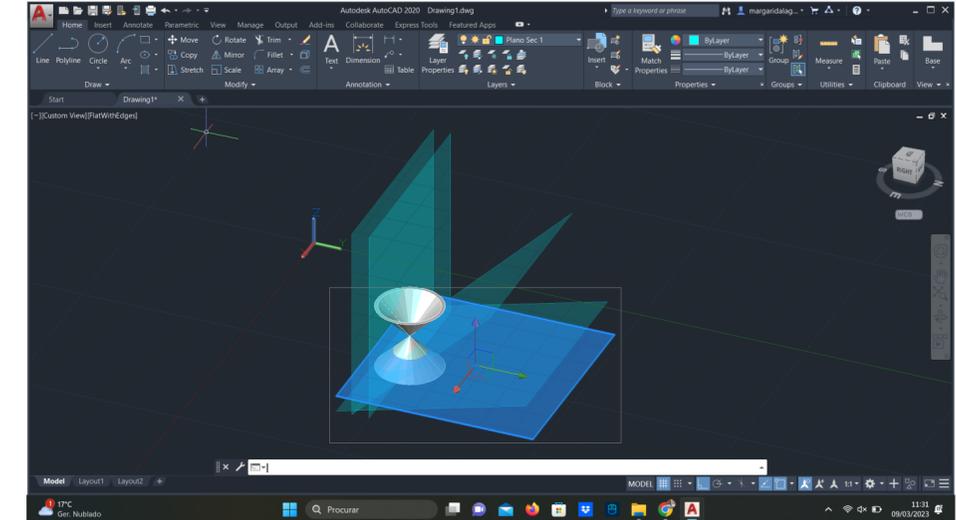
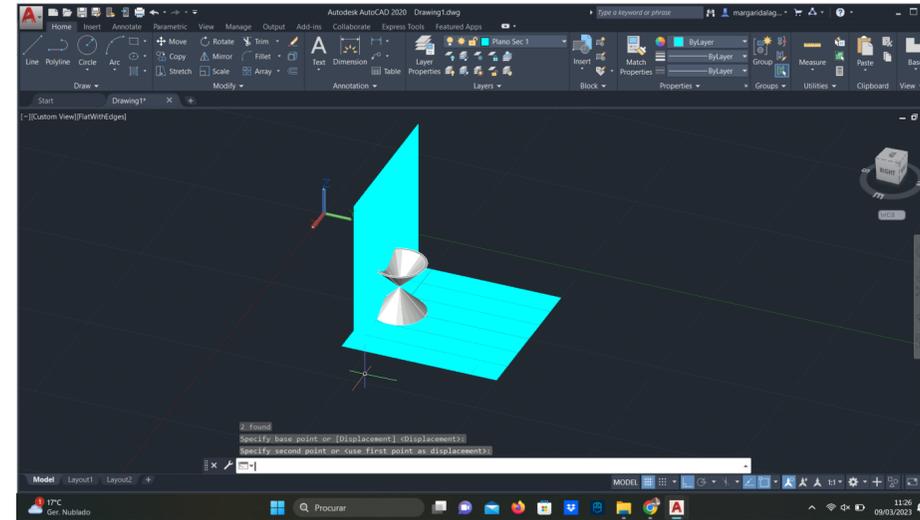
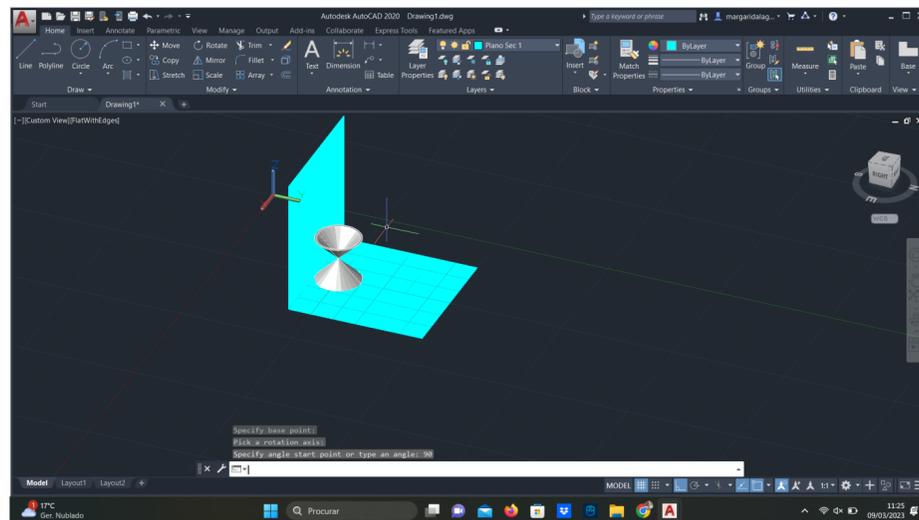


3. Resolução do t.p.c

Exerc. 4.1- Cone, superfície esférica, elíptica, parabólica, hiperbólica e geratrizes

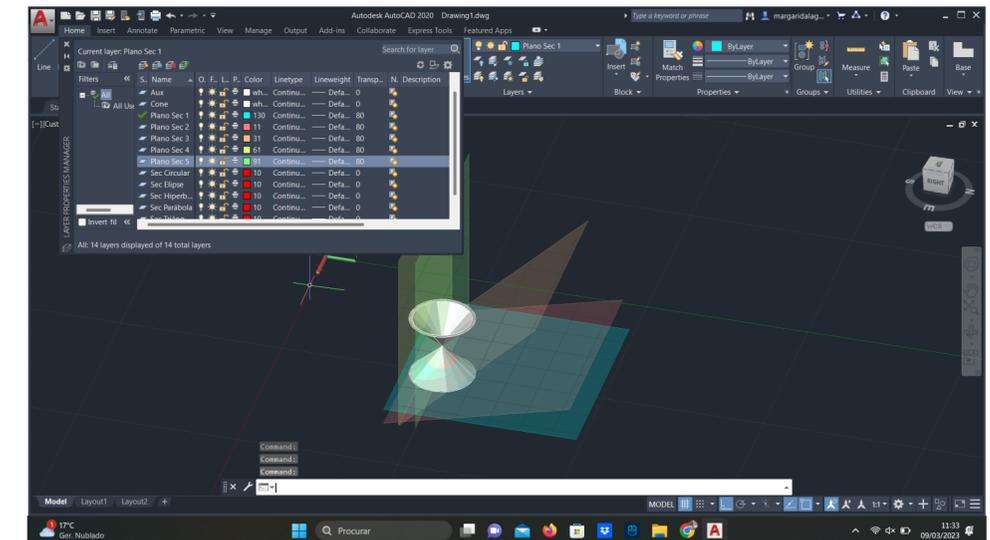
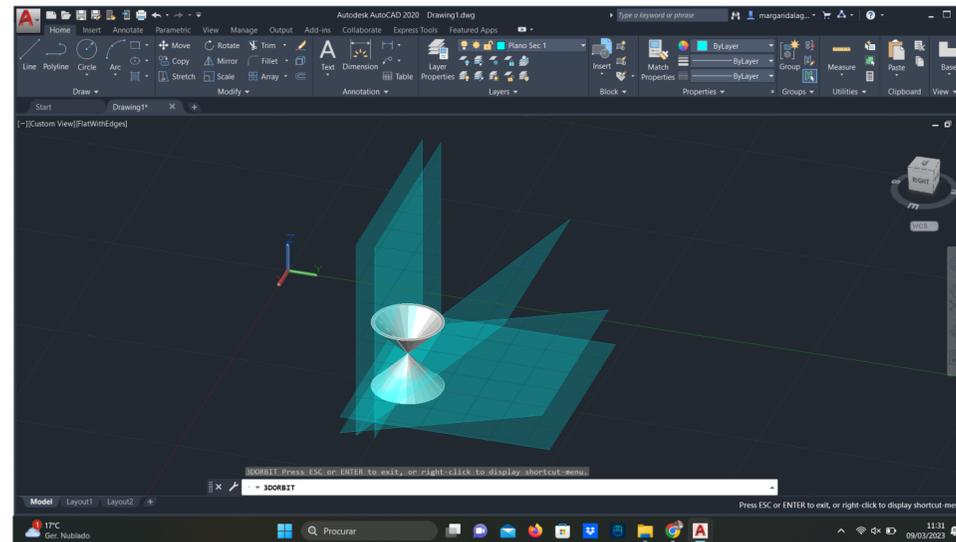
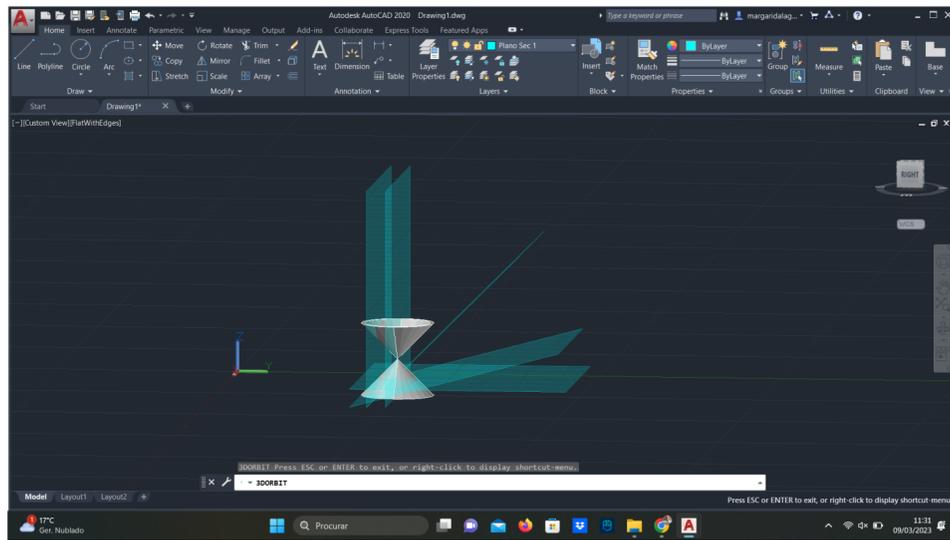


4. Conclusão do exercício

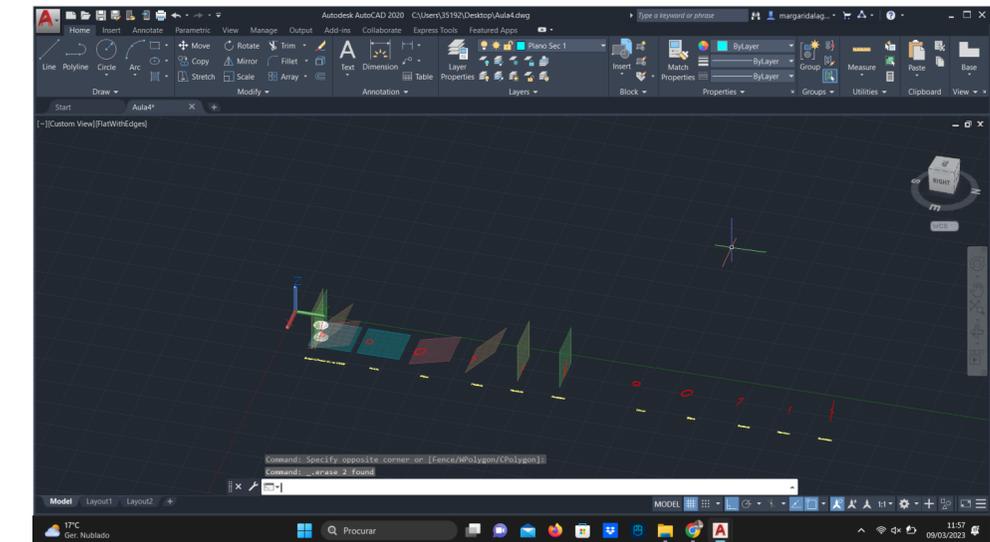
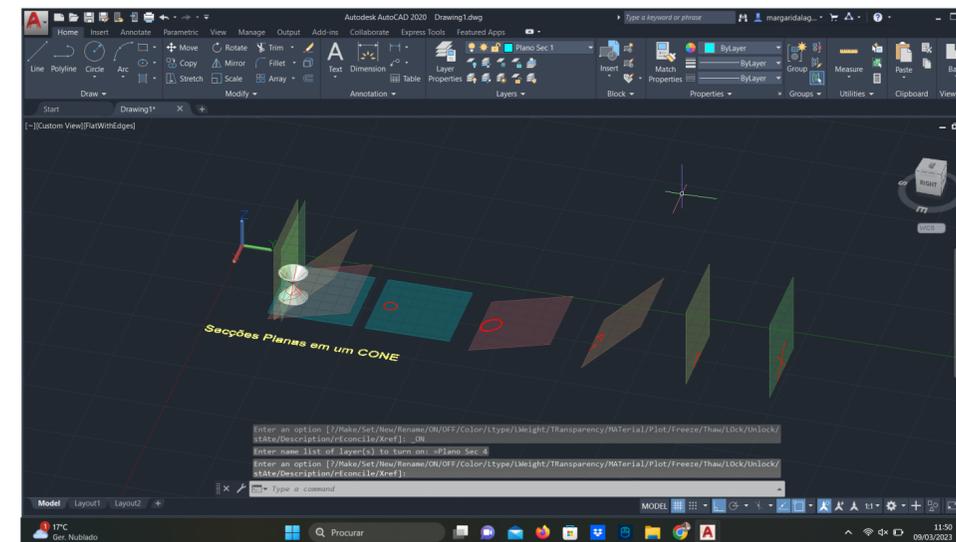
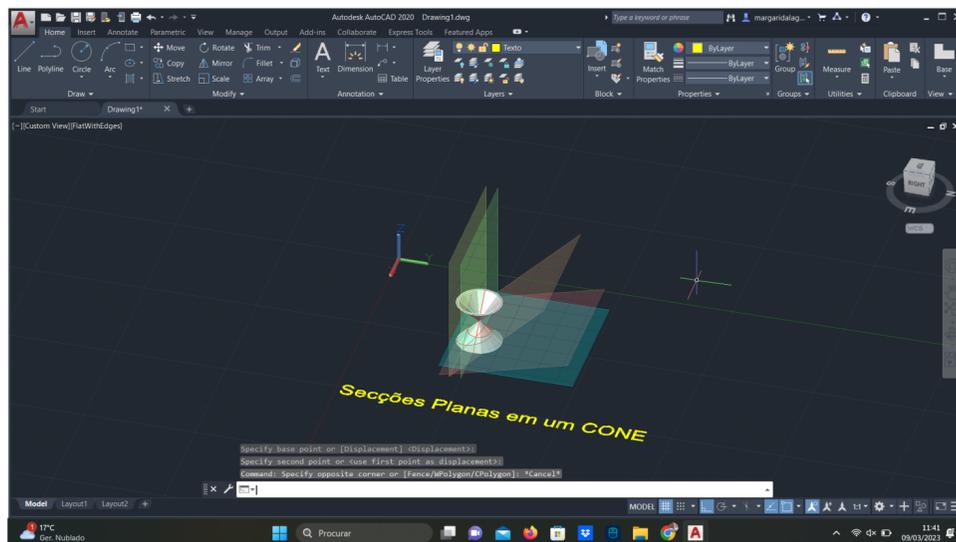


5. Criar 5 planos secantes: um a 90° que passa pelo centro e outro no meio; outro a 45° que passa no plano do meio; outro que passa a 15; outro que passa a 5 unidades de altura

Exerc. 4.1- Cone, superfície esférica, elíptica, parabólica, hiperbólica e geratrizes

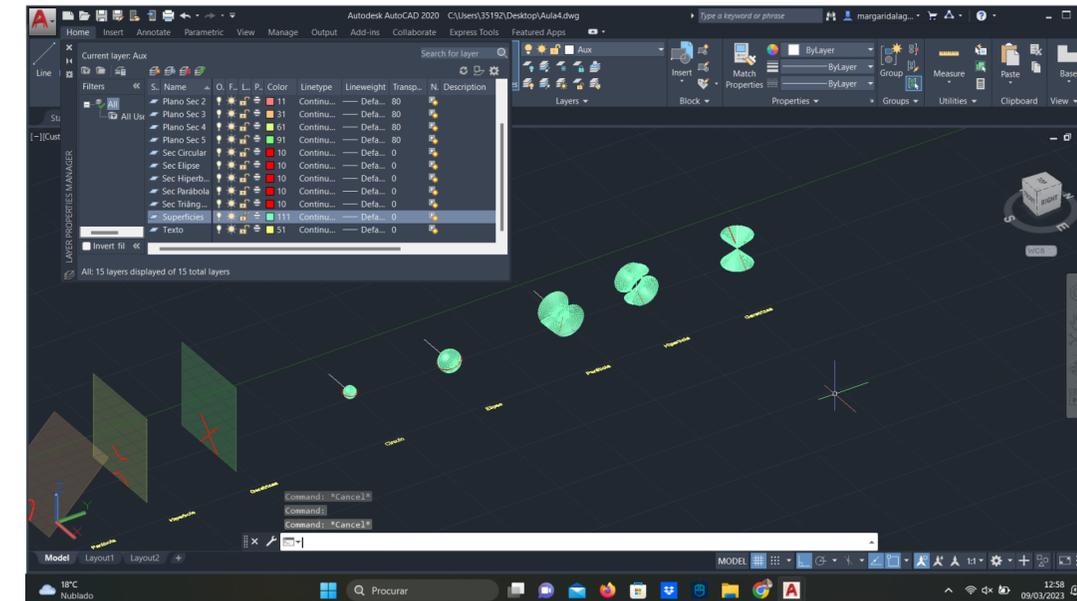
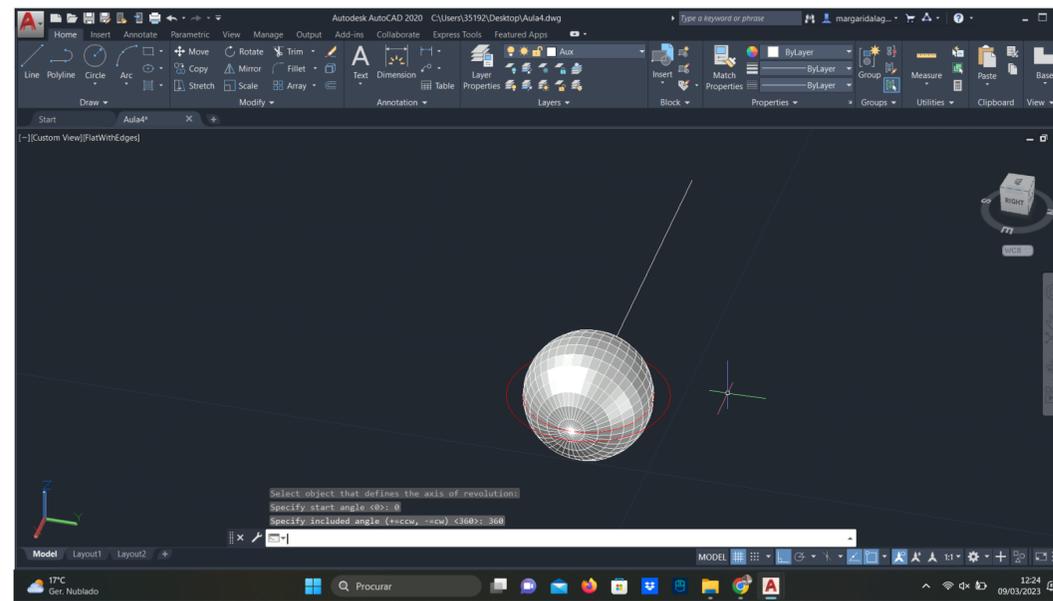


6. Imagens que demonstram a explicação do último passo e para ser menos confuso, dei cores diferentes a cada layer

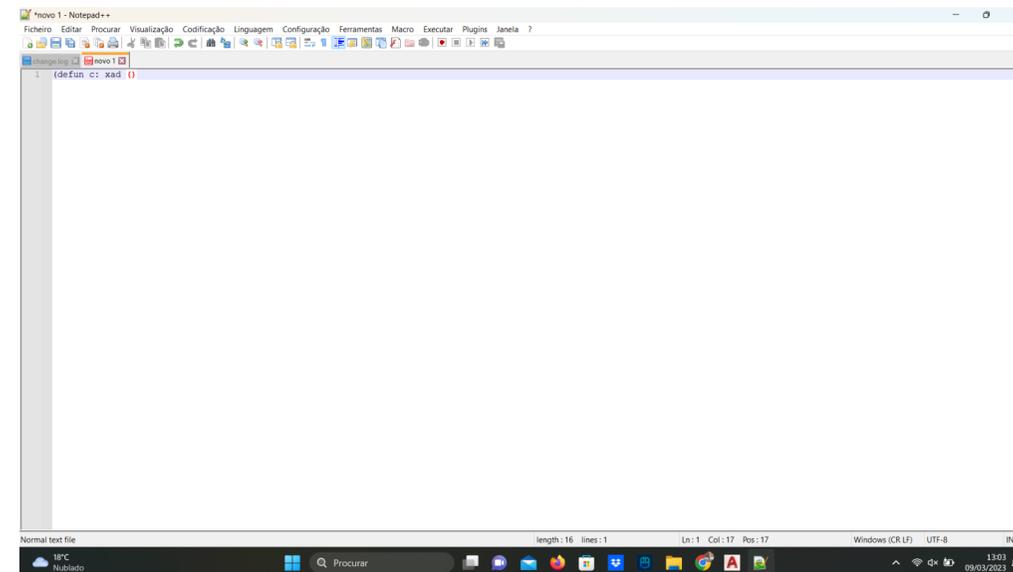


7. Secção com os diferentes planos criados, de seguida utilização dos comandos: **mirror**, **chprop color**, **array rect mod**

Exerc. 4.1- Cone, superfície esférica, elíptica, parabólica, hiperbólica e geratrizes



8. Conclusão do exercício



9. Notepad ++ - iniciação

Exerc. 4.1- Cone, superfície esférica, elíptica, parabólica, hiperbólica e geratrizes