LEARNING ACTIVITY SHEET
SPECIAL PROGRAM IN ICT 8
FREEHAND DESIGN 8 (Technical Drafting)
Fourth Quarter, Week 2

Name of Learner: _____ Date: _____
Grade Level/Section: _____

Tools, Dimensions and Hardwares in CAD

Background for Learners

In this lesson, you will learn the different Tools, Dimensions and Hardwares used in Computer Aided Design (CAD).

What is CAD (Computer Aided Design)?

CAD (Computer Aided Design) is the use of computer software to design and document a product's design process. Engineering drawing entails the use of graphical symbols such as points, lines, curves, planes and shapes. It gives detailed description about any component in a graphical form.

CAD output is often in the form of electronic files for print, machining, or other manufacturing operations. The term CADD (for Computer Aided Design and Drafting) is also used.

CAD software is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a database for manufacturing.

Tools used in CAD

CAD is used to accomplish preliminary design and layouts, design details and calculations, creating 3-D models, and releasing drawings, as well as interfacing with analysis, marketing, manufacturing, and end-user personnel.

The Cad tools are:

1. AutoCad - AutoCAD is a commercial computer-aided design (CAD) and drafting software application. Developed and marketed by Autodesk, AutoCAD was first released in December 1982 as a desktop app running on microcomputers with internal graphics controllers. ... AutoCAD is also available as mobile and web apps.

2. DesignCad- A family of 2D and 3D CAD programs for Windows from IMSI/Design

3. Solidworks 3D Cad- SolidWorks is computer-aided design (CAD) software owned by Dassault Systèmes. It uses the principle of parametric design and generates three kinds of interconnected files: the part, the assembly, and the drawing.

4. Vectorworks- is a versatile, on-premise application that provides extensive 2D drafting, 3D modeling, BIM and rendering capabilities for your architectural and landscape design needs.

5. Shapr3D - It is a 3D modeling tool for mechanical design

6. SolveSpace - is a parametric 3D CAD program. Applications include: • modeling 3d parts – draw with extrudes, revolves, and Boolean (union/difference) operations.

7. OpenScad - is a free software application for creating solid 3D CAD (computer-aided design) objects and defines how they are modified and combined (for instance by intersection, difference, envelope combination and Minkowski sums) to render a 3D model.

8. TinkerCAD - is a free-of-charge, online 3D modeling program that runs in a web browser, known for its simplicity and ease of use.

9. **CATIA (Recommended)** - is a multi-platform software suite for computer-aided design, computer-aided manufacturing, computer-aided engineering, PLM and 3D, developed by the French company Dassault Systèmes.

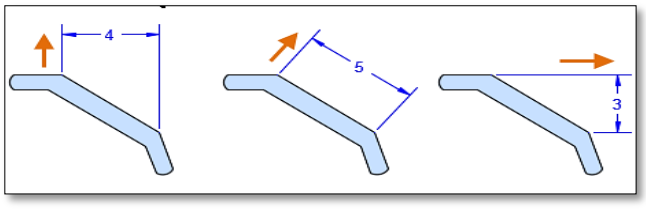
10. Fusion 360° - is a cloud-based CAD/CAM tool for collaborative product development. Fusion 360 enables exploration and iteration on product ideas and collaboration within distributed product development team. Fusion 360 combines organic shapes modelling, mechanical design and manufacturing in one comprehensive package.

Dimensions in CAD

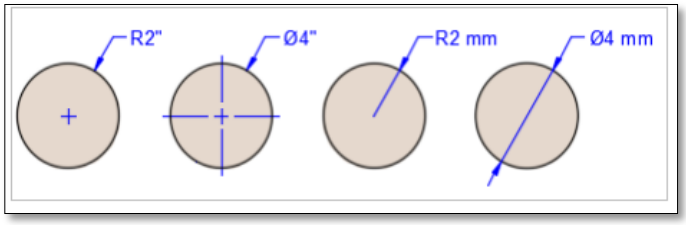
Dimensions are aggregate features used in CAD/AutoCAD to specify dimensions within an AutoCAD drawing.

TYPES OF DIMENSIONS

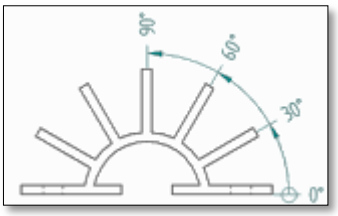
1. Linear Dimension - are used for generating horizontal and vertical dimensions. **ALIGNED** is a command which helps in creating a linear dimension in the aligned position.



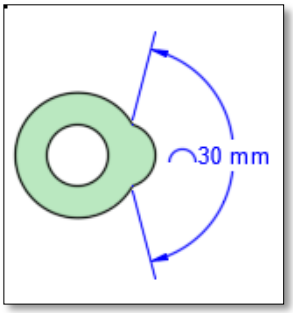
2. Radial Dimension - is basically used for measuring the diameter and radius of circle and arcs by using center marks. there are two commands SIMRAD OR DIMDIAMETER.



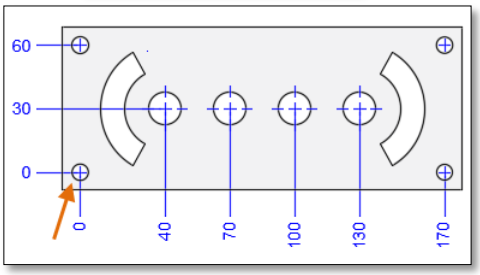
3. Angular Dimension – are the dimensions that calculate the angle between any three or two points. Thus, the angle between two selected geometric objects or three points is measured by angular dimensions.



4. Arc length Dimension - are the dimensions which are used to measure the length of polyline arc or a simple arc.



5. Ordinate Dimension - are not really dimensions because they don't indicate the measurement . The X and Y ordinate values at any point indicate by the **DIMORDINATE** command.



The **hardware used** in a **CAD** system includes: design workstations; digital computers; output devices, such as plotters and printers; and various secondary storage devices.

Required Computer Specifications needed in CAD or AutoCAD

	Minimum Specs	Recommended Specs
Operating Systems	64-bit Microsoft® Windows® 8.1 and Windows 10.	64-bit Microsoft® Windows® 8.1 and Windows 10.
RAM	8 GB	16 GB
Video Card	1 GB GPU with 29 GB/s Bandwidth and DirectX 11 compliant	4 GB GPU with 106 GB/s Bandwidth and DirectX 11 compliant
Processor	2.5–2.9 GHz processor	3+ GHz processor
Storage	Hard drive with at least 7GB free	SSD (Solid State Drive) with at least 7GB free
Monitor Resolution	1920 x 1080 with True Color	Resolutions up to 3840 x 2160 supported on Windows 10, 64-bit systems (with capable display card)
Pointing Device	MS-Mouse compliant device	MS-Mouse compliant device

Activity 1: Identification: Write your answer in a one whole sheet of paper.

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4. is the use of computer software to design and document a product's design process.

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6. dimensions are used for generating horizontal and vertical dimensions. **ALIGNED** is a command which helps in creating a linear dimension in the aligned position.

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9. combines organic shapes modelling, mechanical design and manufacturing in one comprehensive package.

10. is a free software application for creating solid 3D CAD (computer-aided design) objects.

Activity 2: Draw a figure showing the different dimensions in CAD
Write your answer in a one whole sheet of paper.

1. Linear Dimension
2. Ordinate Dimension
3. Angular Dimension
4. Arc length Dimension
5. Radial Dimension

Activity 3: Identify the 10 different Tools in CAD

Write your answer in a one whole sheet of paper.

REFLECTION: Write your answer in a one whole sheet of paper.

Why is it important to be familiarized with the different Tools, Dimensions and Hardwares used in Computer Aided Design (CAD)?

References: Website:

https://www.quora.com/What-are-CAD-tools
https://www.inc.com/encyclopedia/computer-aided-design-cad-and-computer-aided-cam.html
http://cad-training-institute.blogspot.com/2018/07/types-of-dimensions-in-autocad.html
https://docs.safe.com/fme/html/FME_Desktop_Documentation/FME_ReadersWriters/acad/Dimensions.htm

Note: the output may vary depending on the students skills in illustrating and the materials used.

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