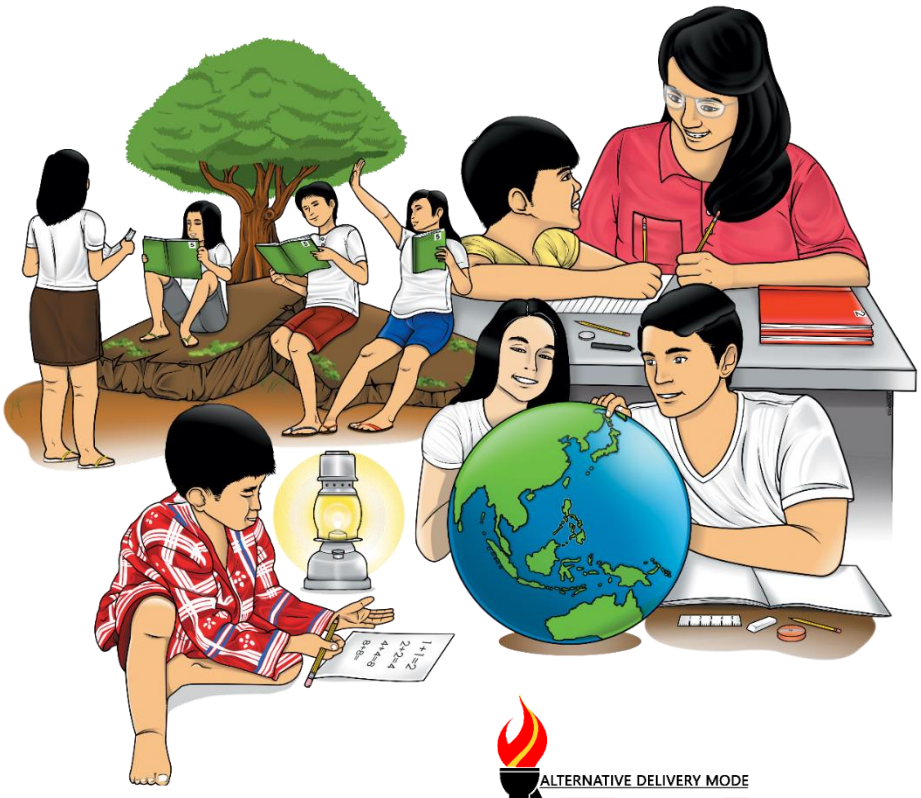
10

Technology and Livelihood Education

Quarter 1 - Module 3
Operate CAD Software and Computer Hardware
(Manipulating CAD Features: Commands)

Technical Drafting NC II



ALTERNATIVE DELIVERY MODE

10

Technology and Livelihood Education

Quarter 1 - Module 3
Operate CAD Software and Computer Hardware
(Manipulating CAD Features: Commands)

Technical Drafting NC II

DepED
DEPARTMENT OF EDUCATION

ICT-Technical Drafting – Grade 10
Alternative Delivery Mode
Quarter 1 – Module 2: Operate CAD Software and Computer Hardware
(Manipulating CAD features: Commands)

Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

Development Team of the Module

Writer: Altea E. Ramos
Editors:
Reviewer: Jonalyn C. Ambrona
Mary Jane N. Malihod
Illustrator:
Layout Artist:
Management Team: Estela Leon-Cariño
Carmel F. Meris
Rosita C. Agnasi
Marie Carolyn B. Verano
Christopher C. Benigno
Juliet C. Sannad
Mary Jane N. Malihod
Armi Victoria Fiangaan
Brenda M. Cariño

Printed in the Philippines by:

Department of Education – Cordillera Administrative Region

Office Address: Wangal, La Trinidad, Benguet
Telefax: (074) -422 -4074
E-mail Address: car@deped.gov.ph

Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLMS is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and test. And read the instructions carefully before performing each task.

If you have questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

Notes to the Teacher

This contains helpful tips or strategies that will help you in guiding the learner.

For the facilitator:

Hi, as a facilitator you are expected to orient the learners on how to use this module. You also need to keep track of the learners' progress while allowing them to manage their own learning. Kindly, advise the learner's parents or guardians of the same procedure since they will be the primary supporters in the learners' progress. Please, do not forget to remind the learner to use separate sheets in answering all of the activities found in the learning module

For the learner:

Hello learner, Welcome to the Technical Drafting NC II Alternative Delivery Mode (ADM) Module on Manipulating CAD features: Commands. I hope you are ready to

progress in your Grade 10 TLE in Technical Drafting with this learning module. This is designed to provide you with interactive tasks to further develop the desired learning competencies prescribed in our curriculum. With this, you are expected to appreciate staking through the information and activity given.

This module has the following parts and corresponding icons:

ICON	LABEL	DETAIL
	What I Need to Know	This contains the learning objectives which you need to accomplish.
	What I know	This evaluates what you know about the lesson you are to learn.
	What's In	This connects the current lesson with a topic necessary in your understanding.
	What's New	This introduces the lesson through an activity.
	What Is It	This contains a brief discussion of the learning module lesson.
	What's More	These are activities to check your understanding of the lesson.
	What I have Learned	This summarizes the important ideas presented in the lesson.
	What I Can Do	This is a real-life application of what you have learned.
	Assessment	This is a post assessment of what you have learned.
	Additional Activity	This is an activity that will strengthen your knowledge about the lesson.

At the end of this module you will also find:

References	This is a list of all sources used in developing this module.

TABLE OF CONTENTS

Lesson 1 Manipulating CAD Features as per Job Requirement: Commands

The following are some reminders in using this module:

1. Use the module with care. Do not put unnecessary mark/s on any part of the module. Use a separate sheet of paper in answering the exercises.
2. Don't forget to answer *What I Know* before moving on to the other activities included in the module.
3. Read the instruction carefully before doing each task.
4. Observe honesty and integrity in doing the tasks and checking your answers.
5. Finish the task at hand before proceeding to the next.
6. Return this module to your teacher/facilitator once you are through with it.

If you encounter any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator. Always bear in mind that you are not alone.

We hope that through this material, you will experience meaningful learning and gain deep understanding of the relevant competencies. You can do it!

What I Need to Know

This module was designed and written to guide you to acquire the learning competencies and develop your skills in manipulating the AutoCAD Commands in ICT-Technical Drafting. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. However, the order in which you read the module can be changed to correspond with the textbook you are now using.

Quarter/Week	Q1/W3
Learning Competency Code	TLE_ICTTD9-12CA-Ic-j- 2
Learning Competency	**LO 1. Operate CAD software and computer hardware** 1.3 Manipulate CAD features as per job requirement: Commands

Learning Objectives:

After going through this module, you are expected to:

1. identify the different drawing commands and its functions.
2. draft the plate exercise using the drawing commands; and,
3. manifest organization and creativity in choosing the appropriate commands in a drawing.

What I Know

Pretest

Multiple Choice.

Directions: Choose the letter of the best answer. Write the chosen letter on the separate sheet of paper.

1. It is a drawing command like the line command except that the resulting object may be composed of several segments which form a single object.
   A. Line C. Polygon
   B. Polyline D. Construction Line
2. Which of the following shortcut key command is used to draw arcs?
   A. A C. POL
   B. C D. REC
3. Which of the following commands does not belong to the group?
   A. MI C. REC
   B. A D. POL
4. It is a command used to create a 2D spiral or 3D spiral.
   A. Arc C. Ellipse
   B. Helix D. Revision Cloud
5. It is a command that creates a line of infinite length which passes through twopicked points.
   A. Line C. Polygon
   B. Polyline D. Construction Line
6. It is a drawing command used to "mask" part of a drawing for clarity.
   A. Line C. Rectangle
   B. Helix D. Wipe Out
7. Pressing the_____key repeat the last command used.
   A. Escape C. Left Click
   B. Delete D. Spacebar
8. Which of the following command is used to draw a rectangle whose sides arevertical and horizontal?
   A. Circle C. Polygon
   B. Ellipse D. Rectangle

9. What is the shortcut key of Polyline command?
   A. PL C. Poly
   B. PLL D. Polyline
10. Which of the following is the shortcut key of Ellipse command?
    A. EL C. ELS
    B. ELP D. ELLY
11. Which of the following types of circles is used to create circle with specified radiustangent to two objects?
    A. 3-point C. Center, diameter
    B. Tan, Tan, Tan D. Tan, Tan, Radius

12. It is a command that creates a revision cloud drawing a rectangle.
    A. Adobe cloud
    B. Google Cloud
    C. Revision cloud
    D. One drive cloud
13. It is a command that draws a simple line from one point to another.
    A. Arc
    B. Ellipse
    C. Line
    D. Construction Line
14. Which of the following types of circles is used to create a circle using a center pointand a radius?
    A. 2-point
    B. 3-point
    C. Center, diameter
    D. Center, radius
15. In AutoCAD, how many sides can polygon draw?
    A. 1021
    B. 1022
    C. 1023
    D. 1024

What's In

Fill Me Up

Directions. Read the different statements carefully and fill out the boxes with correct letters to complete the correct word that best describes the statements. Write your answers on the answer sheet provided.

1. This is the horizontal strip across the top of an application's window.

2. This is the part of the AutoCAD working environment where you can save your drawing file?

3. It is used to create new objects such as lines and circles.

4. It is a type of cursor consisting of two lines that intersect and are used to locate points and selects objects in your drawing.

5. It is where you enter the commands from the keyboard and where the prompts are displayed.

What's New

Riddle Me This

Directions. Read, analyze, and try to answer the riddle. Write your answer on the answer sheet provided.

① What shape am I
I have four sides
All of my sides are the same length
I also have four corners.
Do you know what shape I am?

② What shape am I
I have four sides and four corners
I am not a square or a rectangle
Two of my sides are parallel
Do you know what shape I am?

③ What shape am I
I have eight corners.
All my sides are straight.

Do you know what shape I am?

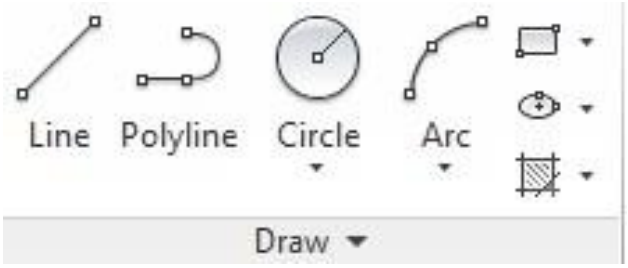
④ What shape am I
I am a shape that has no edges.
I am a shape you'd draw to show that you love something.

Do you know what shape I am?

What Is It

Basic Drawing Commands

The Draw commands can be used to create new objects such as lines and circles. Most AutoCAD drawings are composed purely and simply from these basic components. A good understanding of the Draw commands is fundamental to the efficient use of AutoCAD.



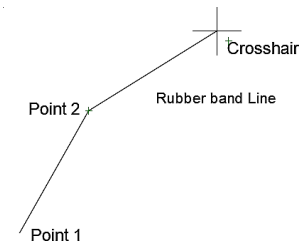
Command names or shortcuts can be entered at the keyboard, commands can be started from the Draw pull-down menu, shown on the right or from the Draw toolbar. The method you use is dependent upon the type of work you are doing and how experienced a user you are. Do not worry too much about this, just use whatever method you feel the easiest or the most convenient at the time. Your drawing technique will improve over time and with experience so do not expect to be working very quickly at first.

Let us explore the different commands in drawing toolbar.

1. Line Command

With the Line command you can draw a simple line from one point toanother. When you pick the first point and move the crosshairs to thelocation of the second point you will see a rubber band line which shows you where the line will be drawn when the second point is picked.

Command: LINE or
L(enter)Specify first point:
(pick P1)



2. The Construction Line
   Shortcut key: XL

   The Construction Line command creates a line of **infinite** length which passes through two picked points. Construction lines are very useful for creating construction frameworks or grids within which to design.

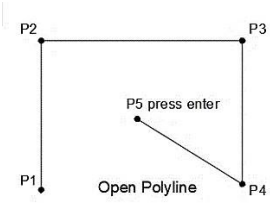
   Command: XLine
   Specify first point (pick P1)
   Specify through point (pick P2)

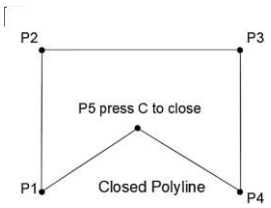
3. Polyline Command

   Shortcut Key: PL
   The Polyline or **Pline** command is like the line command except thatthe resulting object may be composed of several segments which form a single object. In addition to the two ends a polyline is said to have vertices (singular vertex) where intermediate line segments join. Follow the command sequence below to see how this works.

Command Sequence

Command: PLINE
Specify start point: (pick P1)
Current linewidth is 0.0000
Specify next point or [Arc/Halfwidth/Length/Undo/Width]: (pick P2)
Specify next point or [Arc/Close/Halfwidth/Length/Undo/Width]: (pick P3)Specify next point or [Arc/Close/Halfwidth/Length/Undo/Width]: (pick P4)Specify next point or [Arc/Close/Halfwidth/Length/Undo/Width]: (pick P5)
Specify next point or [Arc/Close/Halfwidth/Length/Undo/Width]: Return (or Cto close)





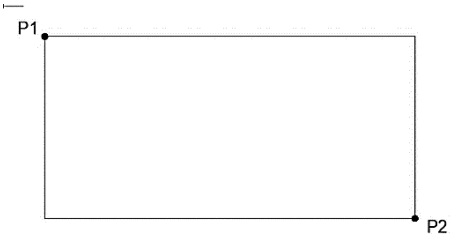
4. Rectangle Command

Shortcut Key: Rec

The Rectangle command is used to draw a rectangle whose sidesare vertical and horizontal. The position and size of the rectangle are defined by picking two diagonal corners.

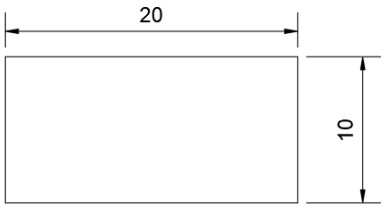
Command Sequence

Command: RECTANGLE
Specify first corner point or [Chamfer/Elevation/Fillet/Thickness/Width]: (pick P1)Specify other corner point or [Dimensions]: (pick P2)



Say you wanted to draw a rectangle 20 drawing units long and 10 drawing unitswide. The command sequence would look like this:

Command: RECTANGLE
Specify first corner point or [Chamfer/Elevation/Fillet/Thickness/Width]: (pick apoint)
Specify other corner point or
[Dimensions]: DSpecify length for
rectangles <0.0000>: 20
Specify width for rectangles <0.0000>: 10
Specify other corner point or [Dimensions]: (pick a point to fix the orientation)



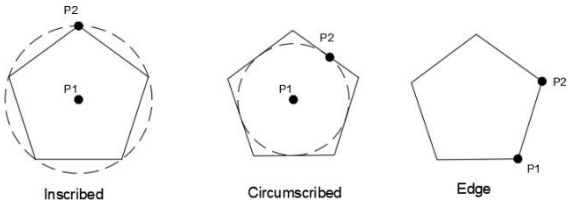
4. Polygon command

Shortcut Key: Pol

The Polygon command can be used to draw any regular polygon from 3 sides up to 1024 sides. This command requires four inputs from the user, the number of sides, a pick point for the center of the polygon, whether you want the polygon **inscribed** or **circumscribed** and then a pick point which determines both the radius of this imaginary circle and the orientation of the polygon. The polygon command creates a closed polyline in the shape of the required polygon.

Command Sequence

Command: POLYGON or POL
Enter number of sides <4>: 5
Return
Specify center of polygon or [Edge]: (pick P1 or type E to define by edgelength)
Enter an option [Inscribed in circle/Circumscribed about circle] <I>:
Return (toaccept the inscribed default or type C for circumscribed)
Specify radius of circle: (pick P2 or enter exact radius)



In the illustration above, the polygon on the left is inscribed (inside the circle with the polygon vertexes touching it), the one in the middle is circumscribed (outside the circle with the polyline edges tangential to it) and the one on the right is defined by the length of an edge.

5. The Circle Command

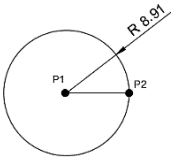
Shortcut Key: C
The Circle command is used to draw circles. There are several ways you can define the circle. The default method is to pick the center point andthen to either pick a second point on the circumference of the circle or enterthe circle radius at the keyboard.

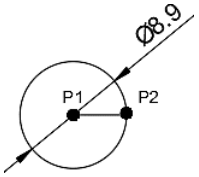
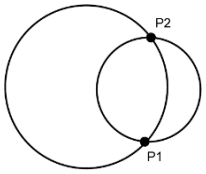
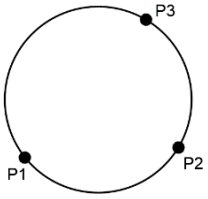
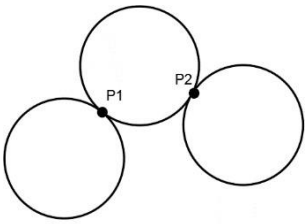
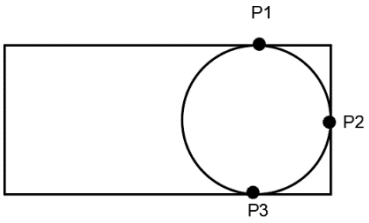
Command Sequence

Command: CIRCLE
Specify center point for circle or [3P/2P/Ttr (tan tan radius)]: (pick P1) Specify radius of circle or [Diameter] <50.0195>: (pick P2 or enter the exactradius)

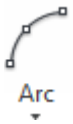
There are different types of circles:

1. Center, Radius — Create a circle using a centerpoint and a radius



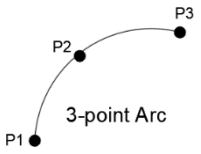
2. Center, Diameter	Create a circle using a centerpoint and a diameter	
3. 2-Point	Create a circle using a twoendpoint of the diameter	
4. 3-Point	Create a circle using three points on the circumference	
5. Tan, Tan, Radius	Create a circle with specified radius tangent totwo objects.	
6. Tan, Tan, Tan	Create a circle tangent tothree objects	

6. The Arc Command
   Shortcut Key: A



The Arc command allows you to draw an arc of a circle. There are numerous ways to define an arc, the default method uses three pick points,a start points, a second point and an end point. Using this method, the drawn arc will start at the first pick point, pass through the second point and end at the third point. Once you have mastered the default method try some of theothers. You may, for example need to draw an arc with a specific radius. All the Arccommand options are available from the pull-down menu.

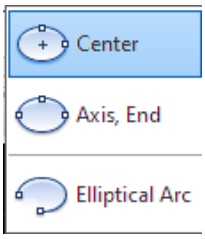
Command SequenceCommand: ARC or A
Specify start point of arc or [Center]: (pick P1)
Specify second point of arc or [Center/End]:
(pick P2)Specify end point of arc: (pick P3)



7. The Ellipse Command

Shortcut Key: EL

The Ellipse command gives you several different creation options. The default option is to pick the two end points of an axis and then a third point to define the eccentricity of the ellipse. After you have mastered the default option, try out the others.

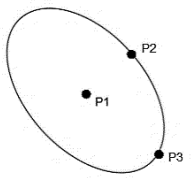


Command Sequence

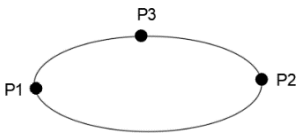
Command: ELLIPSE
Specify axis endpoint of ellipse or [Arc/Center]: (pick P1)
Specify another endpoint of axis: (pick P2)
Specify distance to other axis or [Rotation]: (pick P3)

Types of Ellipses

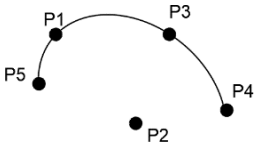
a. Center — Creates an ellipse usingspecified center point



b. Axis, End — Creates an ellipse or anelliptical arc.

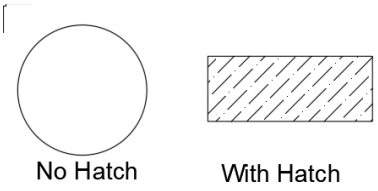


c. Elliptical Arc — Creates an elliptical arc.



8. Hatch Command

Fills an enclosed area or selected object with a hatch pattern or fill.

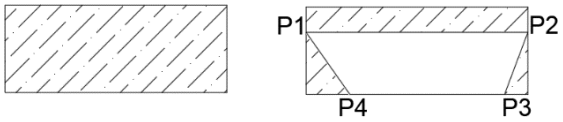


Other drawing command

9. The Wipe Out Command

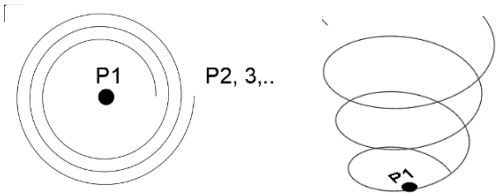
Keyboard Shortcut: Wipe out

A Wipeout is an image type object. Most commonly it is used to "mask" part of a drawing for clarity. For example, you may want to add text to a complicated part of a drawing.



10. Helix

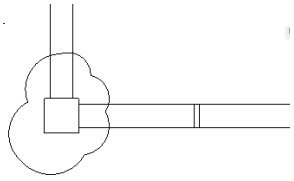
Keyboard Shortcut: Helix Creates a 2D spiral or 3D spiral



2D Helix 3D Helix

11. Rectangular revision cloud

Creates a revision cloud drawing a rectangle.



TIPS and TRICKS

You will have noticed that many of the draw commands require the ***Enter*** key on the keyboard to be pressed to end them. In AutoCAD, clicking the *right mouse key and selecting "Enter"* from the context menu has the same effect as using the Enter key on the keyboard. Using the right-click context menu is a much more efficient way of working than using the keyboard.

You can also use the Spacebar key or right mouse click to repeat the last command used. When a command has ended, you can start it again by right clicking and selecting "Spacebar command" from the context menu rather that entering the command at the keyboard or selecting it from the pull-down or toolbar. By this method it is possible, for example, to repeat the line command without specifically invoking it.

What's More

THE TRUTH ABOUT DRAWING COMMANDS

Directions: Carefully read and analyze if the statement is true or false. If the statement is true, draw a heart sign ♡ . If the statement is false, underline or write the word or phrases that makes the statement false. Write your answers on the answer sheets provided.

1. Hatch Command fills an enclosed area or selected object with a hatch pattern or fill.
2. The position and size of the rectangle are defined by picking three diagonal corners.
3. The Polyline command is like the line command except that the resulting object may be composed of several segments which form a single object.
4. The polygon is circumscribed when the inside of the circle with the polygon vertexes touching it.
5. The Polygon command can be used to draw any regular polygon from 3 sides up to 1025 sides.
6. Wipe out command creates a revision cloud drawing a rectangle.
7. Construction lines are very useful for creating constructionframeworks or grids within which to design.
8. You can also use the Escape key or right mouse click to repeat the last command used.
9. Clicking the right mouse key and selecting "Enter" from the context menu has the same effect as using the Enter key on the keyboard.
10. The arc command used to draw simple line from one point to another.

What I Have Learned

Stating Concept
Directions. Generalize your learning from this module by completing the statement below. Use your own words or understanding when completing the statements and write your answers on the answer sheets provided.

From this module I have learned that

Drawing commands are located at the _____. They are used to _____.

Some examples of drawing commands are _____ _____.

The drawing commands helps me in _____ _____.

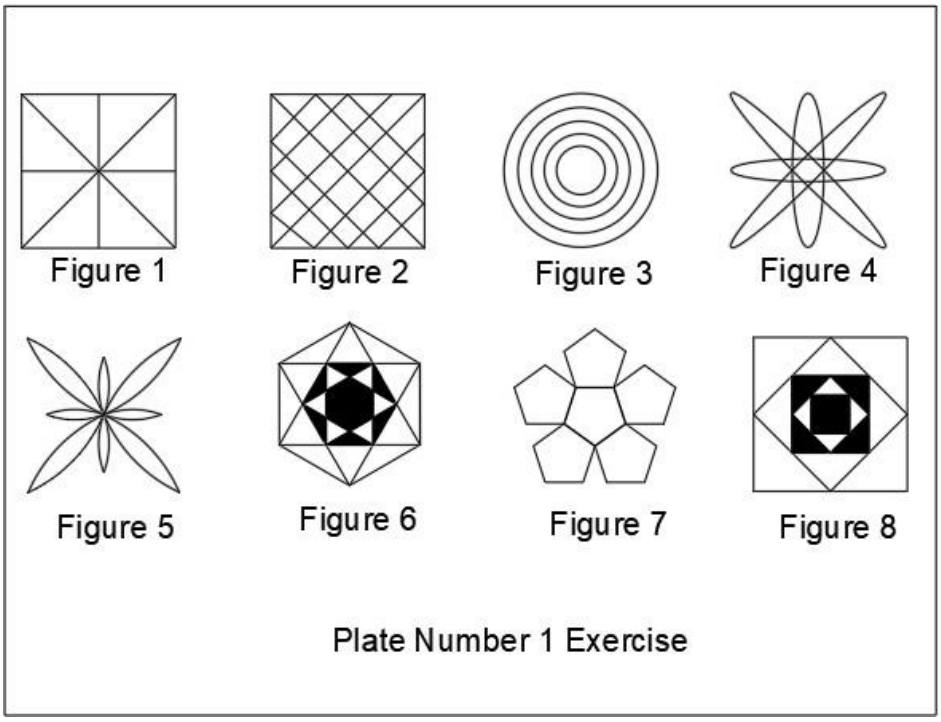
What I Can Do

Activity 1: Plate Exercise

Directions.

1. Explore the drawing commands by drafting the given figures below.
2. Save your work as <LastName_FirstName_myplateexercise1>.dwg

Note: This exercise is only applicable for those who have computer devices and AutoCAD software. If you don't have any devices and AutoCAD software, you can proceed to Activity 2 on page 15.



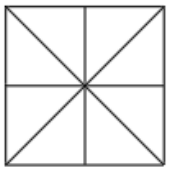


Figure 1

Follow the steps and procedures in drafting figure 1.

1. To draw the rectangle with a dimension of 2x2, click the rectangle command in the drawing tool or type REC in thecommand bar. Drag the rectangle in the workplace.
2. In the command line select dimensions or type d enter>type 2 > press enter>type 2 press enter.
3. Draw horizontal and vertical line in the middle of the rectangle by selecting theline command in drawing tool bar or typing the shortcut key of line- L.
4. Draw diagonal line.
5. Complete your drawing by adding another diagonal line.

Performance Criteria on Plate Exercise

Criteria	Levels of Assessment				Score
	Excellent (10 pts)	Very satisfactory (8 pts)	Satisfactory (5 pts)	Needs Improvement (3 pt)	
Followed the instructions Followed the given instructions/procedure from start to finish,					

observed correct usage of command tools					
Proficiency Perform task with competence and exceptional performance					
Accuracy Perform the task with no errors					
Use of AutoCAD command tools Demonstrate high degree of competency with AutoCAD commands. Can prioritize commands and tools usage to create and modify objects.					
Completeness Drawings are completed quickly and efficiently with no errors					
Total					

Activity 2: Functional Commands

Directions: Write down the functions of each drawing commands and its command sequence. Write your answers on the answer sheet provided

Drawing Command	Functions	Command Sequence
Ex. Circle	Used to draw a circle	Type C in command line or click the circle command in the draw toolbar then press enter.
1. Rectangle		
2. Polygon		
3. Hatch		
4. Arc		

5. Ellipse		
6. Wipe Out		
7. Polyline		
8. Helix		
9. Revision Cloud		
10. Line		

Post-Assessment

Multiple Choice.

Directions: Choose the letter of the best answer. Write the chosen letter on the separate sheet of paper.

1. It is a drawing command like the line command except that the resulting objectmay be composed of several segments which form a single object.
   A. Line C. Polygon
   B. Polyline D. Construction Line
2. Which of the following command is used to draw a rectangle whose sides arevertical and horizontal?
   A. Circle C. Polygon
   B. Ellipse D. Rectangle
3. It is a command used to create a 2D spiral or 3D spiral.
   A. Arc C. Ellipse
   B. Helix D. Revision Cloud
4. In AutoCAD, how many sides can polygon draw?
   A. 1021 C. 1023
   B. 1022 D. 1024

5. Which of the following shortcut key command is used to draw arcs?

A. A C. POL
B. C D. REC

6. It is a drawing command used to "mask" part of a drawing for clarity.

A. Line C. Rectangle
B. Helix D. Wipe Out

7. Which of the following types of circles is used to create circle with specified radiustangent to two objects?

A. 3-point C. Center, diameter
B. Tan, Tan, Tan D. Tan, Tan, Radius

8. Pressing the_____key repeat the last command used.

A. Escape C. Left Click
B. Delete D. Spacebar

9. What is the shortcut key of Polyline command?

A. PL C. Poly
B. PLL D. Polyline

10. Which of the following types of circles is used to create a circle using a center pointand a radius?

A. 2-point C. Center, diameter
B. 3-point D. Center, radius

11. Which of the following command does not belong to the group?

A. MI C. REC
B. A D. POL

12. It is a command that creates a revision cloud drawing a rectangle.

A. Adobe cloud C. Revision cloud
B. Google Cloud D. One drive cloud

13. It is a command that draws a simple line from one point to another.

A. Arc C. Line
B. Ellipse D. Construction Line

14. It is a command that creates a line of infinite length which passes through twopicked points.

A. Line C. Polygon
B. Polyline D. Construction Line

15. Which of the following is the shortcut key of Ellipse command?

A. EL C. ELS
B. ELP D. ELLY

Additional Activity

CRAFTING A FLOWCHART USING BASIC SHAPES

Directions: During the COvid-19 Pandemic, assuming that you are a police officer assigned at a checkpoint station at a major entry point in Defghi City. Using a flowchart, draw how you will implement and make decisions on border management based on the guidelines below.

SECTION 2. GENERAL RESTRICTIONS FOR BORDER MANAGEMENT. The PNP-DEFGHI City Police Office, shall maintain checkpoint stations on major entry points to DEFGHI for the duration of the GCQ, in accordance with the following rules:

A. Authorized Persons Outside of Residence (APOR) travelling for authorized, official, or work-related purposes shall be allowed entry, subject to triage protocols and documentary requirements stated in https://abc.defghij.gov.ph/, or in Advisories that may be issued to have supplement effect hereto;

B. Tourism and leisure travel shall be limited to residents, and non-residents who have duly registered with https://pasyal.defghij.gov.ph/;

C. Residents of the municipalities of Jklmn, Opqr, Stuv, and Wxyz shall be allowed to enter the city to avail of essential goods and services upon the presentation of valid Medical Certificate/Medical Clearance in accordance with the DJOSW Joint Advisory issued on 21 July 2021.

D. Non-APORs may enter the City, provided, they are able to present a valid Joint Task Force Shield Travel Authority duly issued in their place of origin, and they subject themselves for assessment at the City's designated Triage Units.

Performance Rubrics

Criteria	Outstanding (10 points)	Very Satisfactory (7 points)	Satisfactory (5 points)
Drawing	All details and elements have been added. The details are clear and easy to identify. _____	Almost all details and elements (at least 85%) have been added. A few details are difficult to identify. _____	Fewer than 85% of the details and elements are presented or most details are difficult to identify. _____
Neatness	Paper is totally clean _____	Paper has 1-2 erasures _____	Paper has 3 and above erasures _____
Submission	Submitted on time _____	Submitted after the due date. _____	Submitted during the 2nd or 3rd retrieval of Answer Sheets. _____
Overall Total	30 Points	**Actual Score**	/30

Answer Key

What I Know

1. B
2. A
3. A
4. B
5. D
6. D
7. D
8. D
9. A
10. A
11. D
12. C
13. C
14. D
15. D

What's In

1. Menu Bar
2. Menu Browser
3. Draw Command
4. Crosshair
5. Command Line Bar

What's New

1. Square
2. Trapezium
3. Octagon
4. Heart

What's More

1. ↻
2. Three
3. ↻
4. Circumscribed
5. 1025
6. Wipe out command
7. ↻
8. Escape key
9. ↻
10. Arc

Assessment

1. B
2. D
3. B
4. D
5. A
6. D
7. D
8. D
9. A
10. D
11. A
12. C
13. C
14. D
15. A

What I Can Do

Performance output will be evaluated through given rubrics

What I Have Learned

Answers may vary

Additional Activity

Answers may vary

References

Watson, David. "Autocad Tutorial | Drawing Objects | Cadtutor". Cadtutor.Net. Accessed July 26. http://www.cadtutor.net/tutorials/autocad/drawing-objects.php.

Shrock, Cherryl R (2013) “Advanced AutoCAD 2013 Exercise Workbook for Windows”. Professor Drafting Technology Orange Coast Mesa, Ca. Autodesk Authorized Author. Industrial Press.

For inquiries or feedback, please write or call:

Department of Education - Bureau of Learning Resources (DepEd-BLR)
Ground Floor, Bonifacio Bldg., DepEd Complex
Meralco Avenue, Pasig City, Philippines 1600
Telefax: (632) 8634-1072; 8634-1054; 8631-4985
Email Address: blr.lrqad@deped.gov.ph * blr.lrpd@deped.gov.ph
Telefax: (632) 8634-1072; 8634-1054; 8631-4985