**10**

# Technology and Livelihood Education

## Quarter 1 - Module 4
## Operate CAD Software and Computer Hardware
(Manipulating CAD Features: Tools)

## Technical Drafting NC II

ALTERNATIVE DELIVERY MODE
**ADM**

**10**

# Technology and Livelihood Education

## Quarter 1 - Module 4
## Operate CAD Software and Computer Hardware

(Manipulating CAD Features: Tools)
**Technical Drafting NC II**

**DepED**
DEPARTMENT OF EDUCATION

**ICT-Technical Drafting – Grade 10**
**Alternative Delivery Mode**
**Quarter 1 – Module 4: Operate CAD Software and Computer Hardware**
(Manipulating CAD features: Tools)

# 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.

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### Notes to the Teacher

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

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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: Tools. 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

# Manipulating CAD Features as per Job Requirement: Tools

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 exploring the different modifying command 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/W4 |
| 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: Tools |

**Learning Objectives:**
After going through this module, you are expected to:
1. identify and match modifying command to its functions;
2. constructs drawing objects applying the modifying tools; and,
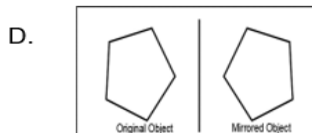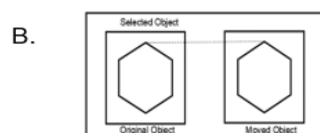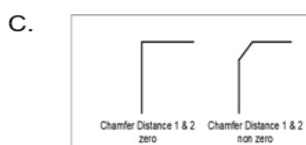3. develop traits such as ingenuity, creativity, independence, and passion towards learning.
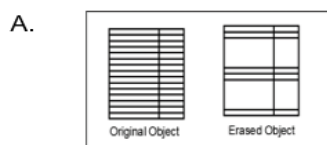
## What I Know

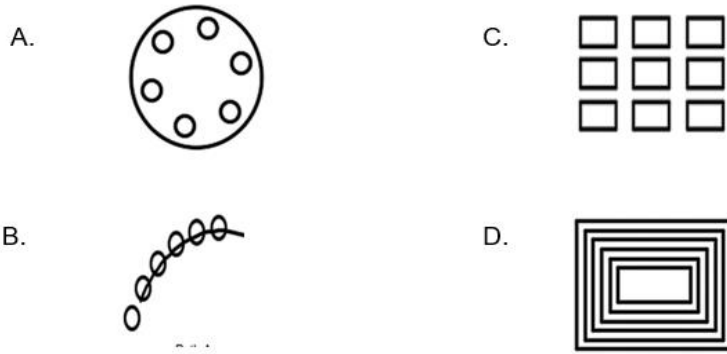**Pretest**

**Multiple Choice.**

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

1. Which of the following command creates a new object parallel to or concentricwith a selected object?
   A. Array          B. Chamfer          C. Fillet          D. Offset
2. Using the _____command, you can duplicate existing objects in a rectangleor circular (polar) pattern.
   A. Array          B. Fillet          C. Offset          D. Scale
3. It is one of the simplest AutoCAD commands.
   A. Cut          B. Delete          C. Erase          D. Trim
4. You want to ungroup the object you drafted, what is the command that breaks the compound object into its component objects?
   A. Break          B. Explode          C. Stretch          D. Separate
5. Which of the following illustrations below is a chamfer command?

A.

Original Object          Erased Object

C.

Chamfer Distance 1 & 2          Chamfer Distance 1 & 2
zero                              non zero

B.

Selected Object

Original Object          Moved Object

D.

Original Object          Mirrored Object

6. It allows you to mirror selected objects in your drawing by picking them and thendefining the position of an imaginary mirror line using two points.
   A. Fillet          B. Mirror          C. Offset          D. Scale

7. What is the modifying command that can be used to trim a part of an object?
   A.   F          B. RO          C. TR          D. Erase
8. Which of the following command can be used to change the size of an object or group of objects?
   A. Explode          B. Trim          C. Scale          D. Stretch

9. Which of the following illustrations below is a polar array command?

A.

C.

B.

D.
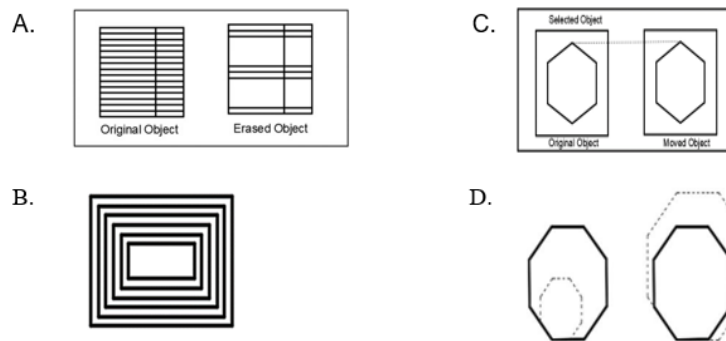
10. Which of the following modifying command can be used to create one or more duplicates of any drawing object/s which you have previously created?

  A. Copy          B. Erase          C. Move          D. Transfer

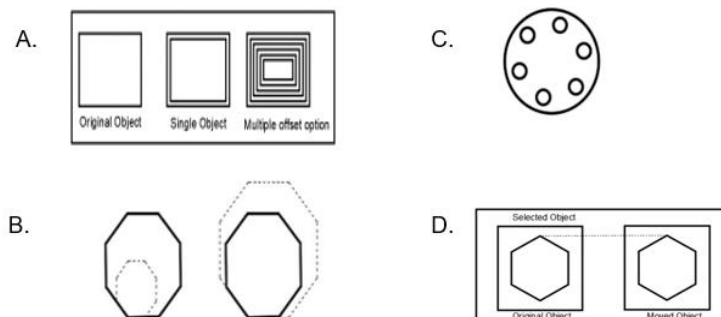11. Which of the following illustrations below is the Copy command?

A.

Original Object          Erased Object

C.

Selected Object

Original Object          Moved Object

B.

D.

12. Which of the following command allows an object or objects to be rotated about a point selected by the user?

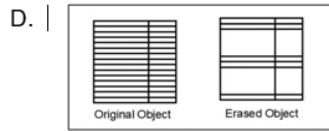  A. Copy          B. Move          C. Rotate          D. Scale
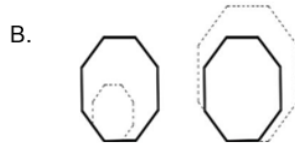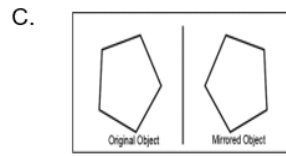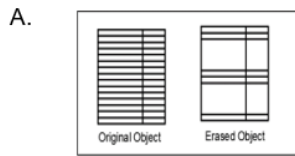
13. It is a command that enables you to create a chamfer between any two non-parallel lines.

  A. Chamfer          B. Fillet          C. Mirror          D. Offset

14. Which of the following illustrations below is the Offset command?

A.

Original Object     Single Object     Multiple offset option

C.

B.

D.

Selected Object

Original Object          Moved Object

15. Which of the following illustrations below is the Scale Command?

A.

Original Object    Erased Object

C.

Original Object    Mirrored Object
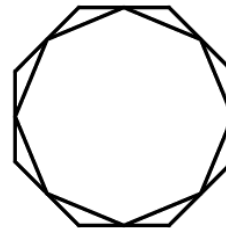
B.

D. |

Original Object    Erased Object



## *What's In*

**Name Me**
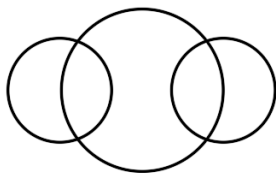
**Directions.** Identify the drawing commands applied in the illustration below. Write your answers on the answer sheet provided.
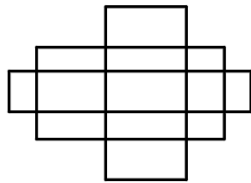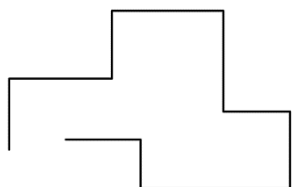
1. _____

2. _____

3._____

4._____

5._____

# *What's New*

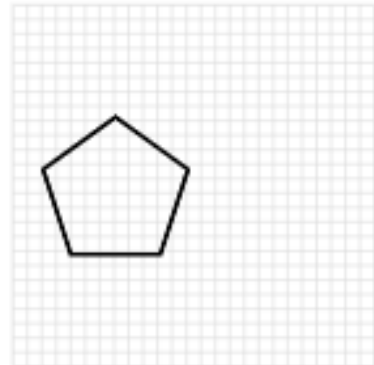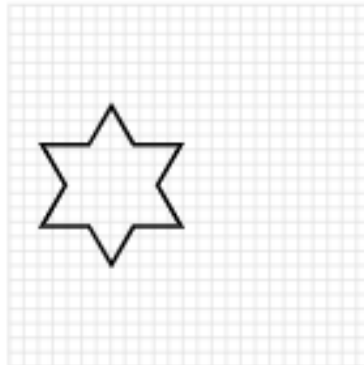**Shape Slip and Slide**

**Directions.** Rotation, reflection, and translation may sound complicated, but the truth is, they're simply shapes moving about. Try your hand with the exercises below. Write your answers on the answer sheet provided.
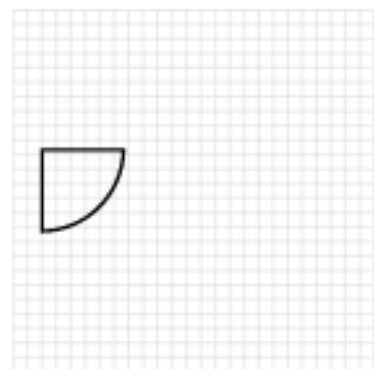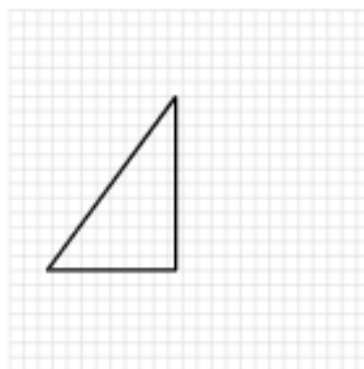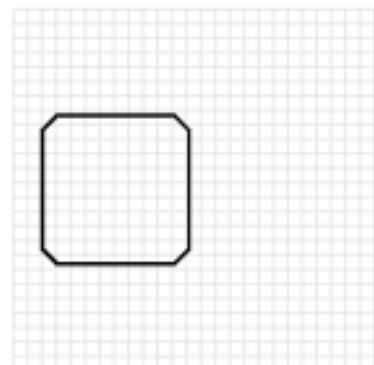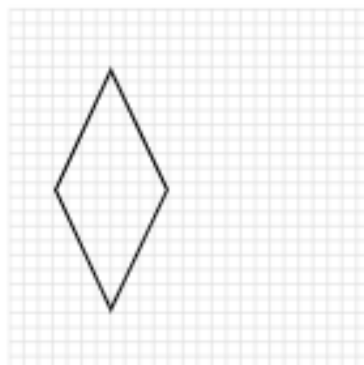
## 01.
**Rotation**

## 02.
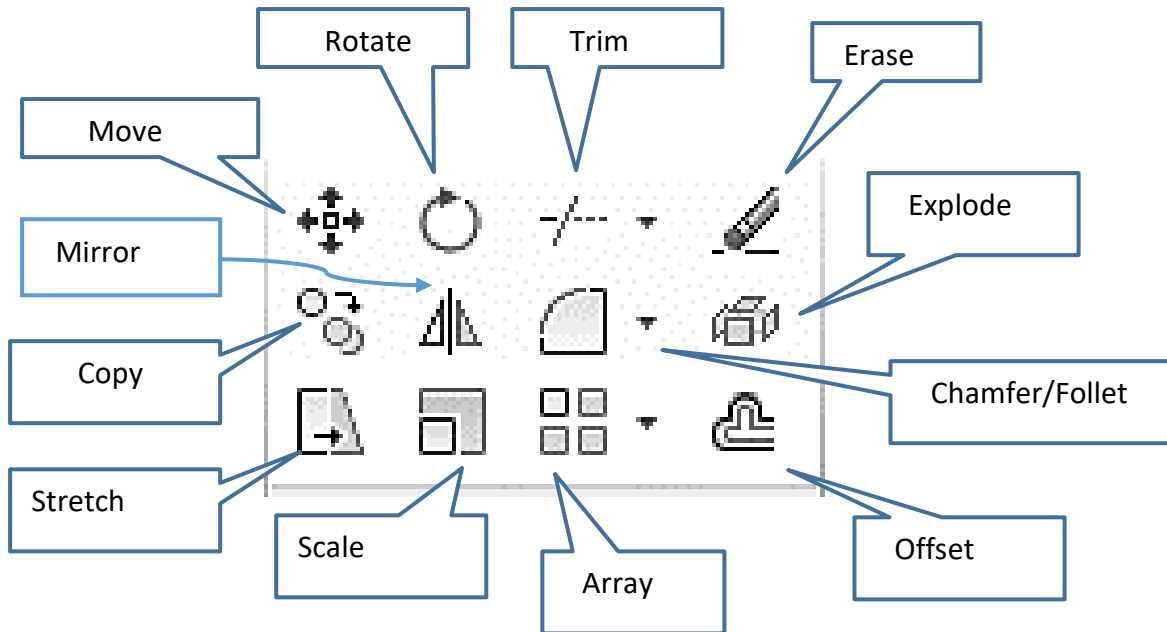**Reflection**

## 03.
**Translation**

## What Is It

Hello learners! In creating your drawing in AutoCAD, you need the right tools to create accurate and precise drawing. AutoCAD provides a whole range of modify tools such as Move, Copy, Rotate and Mirror that you can use to create the image you need.

Let us explore the different modifying commands.
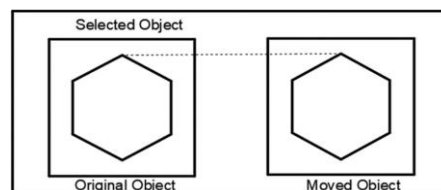


### 1. Move

The Move command works in a similar way to the Copy command except that no copy is made, the selected object(s) is simply moved from one location to another
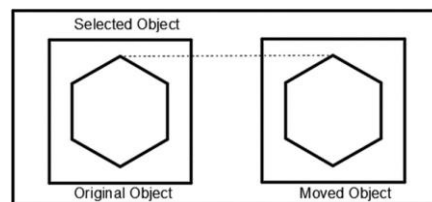
Command: MOVE or M [enter]

### 2. Copy

The copy command can be used to create one or more duplicates of any drawing object or objects which you have previously created.
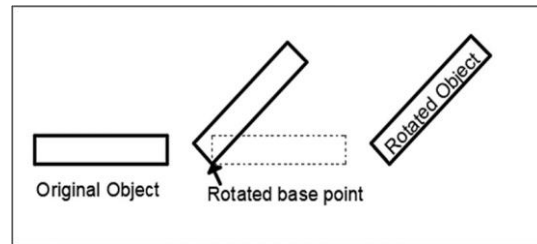
Command Entry: Copy or CO [enter]

### 3. Rotate

The Rotate command allows an object or objects to be rotated about a point selected by the user.
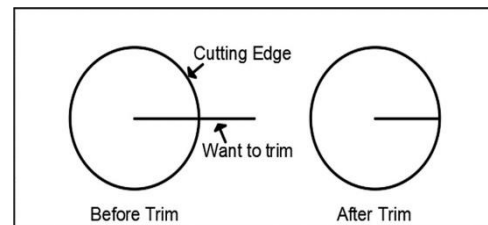
Command: ROTATE or RO [enter]

### 4. Trim

The Trim command can be used to trim a part of an object. In order to trim an object, you must draw a second object which forms the "cutting edge". Cutting edges can be lines, xlines, rays, polylines, circles, arcs or ellipses. Blocks and text cannot be trimmed or used as cutting edges.
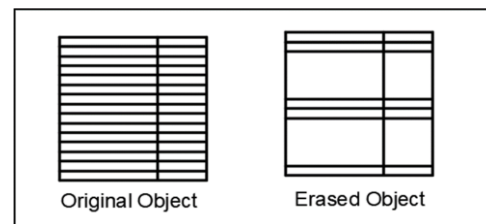
Command: TRIM or TR [enter]

### 5. Erase

The Erase command is one of the simplest AutoCAD commands and is one of the most used. The command erases (deletes) any selected object(s) from the drawing. Remember you can always get deleted objects back by typing U to undo, from the Standard toolbar or by using the OOPS command.
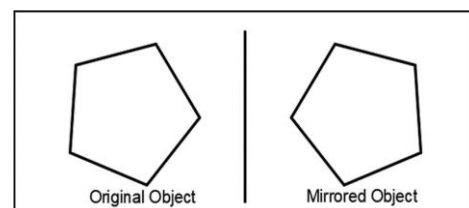Command: ERASE or E [enter]

### 6. Mirror

The Mirror command allows you to mirror selected objects in your drawing by picking them and then defining the position of an imaginary mirror line using two points.

Command: MIRROR or MI [enter]

### 7. Offset

Offset is probably one of the most useful commands for constructing drawings. The Offset command creates a new object parallel to or concentric with a selected object.
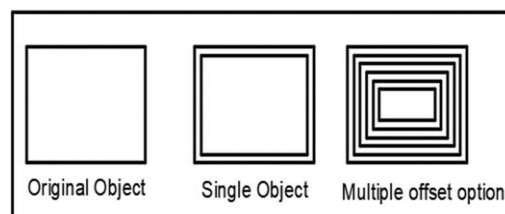
Command: OFFSET or O [enter]

**8. Array**
Using the Array command, you can duplicate existing objects in a rectangle or circular (polar) pattern. You can select which type of array to use in the Array dialog box. Click the Rectangular or Polar options to see point, distance, and method requirements for each type.



Polar Array    Rectangular Array    Path Array
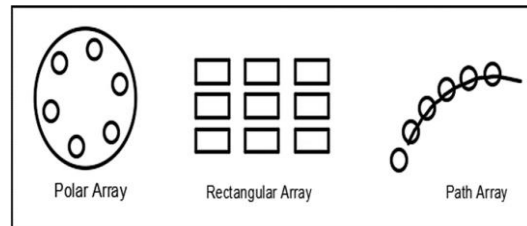
Command: ARRAY or AR [enter]

**9. Chamfer**
The Chamfer command enables you to create a chamfer between any two non- parallel lines as in the illustration below or any two adjacent polyline segments. Usually, the Chamfer command is used to set the chamfer distances before drawing the chamfer. Follow the command sequence below where the chamfer distances are changed to 20 before the chamfer is made.



Chamfer Distance 1 & 2     Chamfer Distance 1 & 2
zero                       non zero
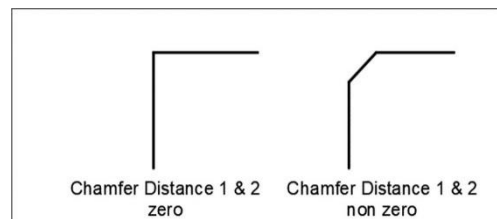
Command: CHAMFER or CHA [enter]

**10. Fillet**
The Fillet command is a very useful tool which allows you to draw an arc between two intersecting lines or adjacent polyline segments. You need first to use the command to set the required radius and then a second time to select the two lines.



Original Object        Radius= 0.50
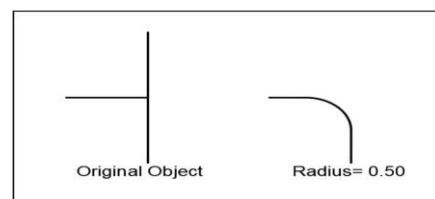
Command: FILLET or F [enter]

**11. Stretch**
The Stretch command can be used to move one or more vertices of an object while leaving the rest of the object unchanged. In the example below, a rectangle has been stretched by moving one vertex to create an irregular shape.

Command: STRETCH or S [enter]

### 12. Scale

The Scale command can be used to change the size of an object or group of objects. You are prompted for a pick point about which the selection set will be scaled.

Scaling can then be completed by picking a second point (not always easy because it can sometimes be difficult to precisely control the scaling) or by entering a scale factor at the keyboard. For example, a scale factor of 2 will double the size of the objects in the selection set and a factor of 0.5 will reduce them into half.
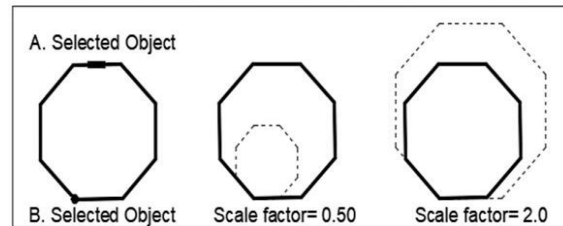


Command: SCALE or SC [enter]

### 13. Explode

The explode command breaks the compound object into its component objects. Command Entry: Explode [enter]



## *What's More*

**Functional Parts**

**Directions.** Based on their names, it is easy to guess the functions of the different modifying tools. Match each parts below with the correct functions. Write your answers on the answer sheet provided.

1. It is a command that can be used to trim a partof an object.

   A. Copy

2. It allows an object or objects to be rotated to a point selected by the user.

   B. Offset

   C. Move

3. It is a command that can be used to change the size of an object or group of objects

4. It allows to mirror selected objects in drawing by picking them and then defining the position of an imaginary mirror line using two points.

   D. Mirror

5. It creates a new object parallel to or concentric with a selected object.

   E. Rotate

6. It is a command that erase (deletes) any selected object(s) from the drawing.

   F. Scale

   G. Trim

7. It is a command that can be used to create one or more duplicates of any drawing object or objects which have been previouslycreated.

8. The selected object(s) is simply moved from one location to another.

   H. Explode

9. It is a command that duplicates objects/entities using polar, rectangular and path options.

   I. Array

   J. Erase

10.   It is a command that breaks the compound object into its component objects.
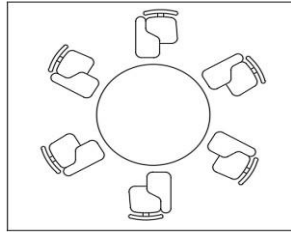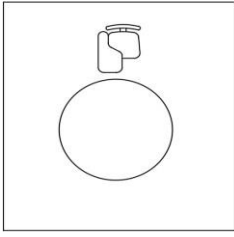
## *What I Have Learned*

**Missing Names**
**Directions.** Determine the modifying command applicable in the drawing. Write your answers on the answer sheet provided.
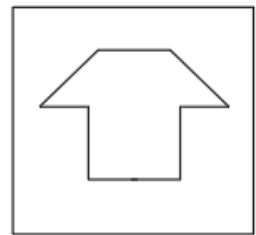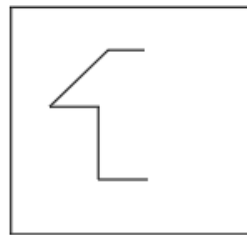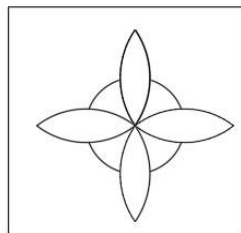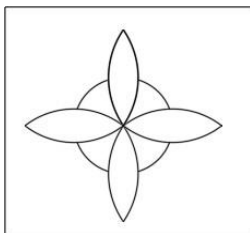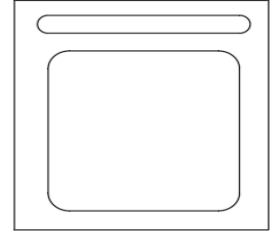
1. _____          2. _____
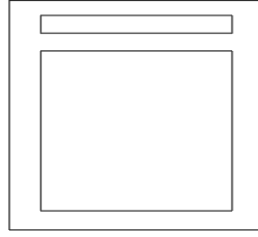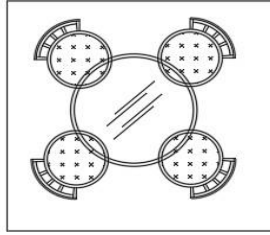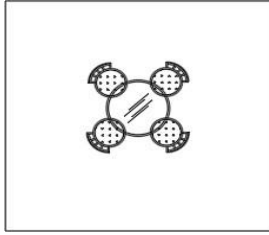
3._____



4. _____



5._____
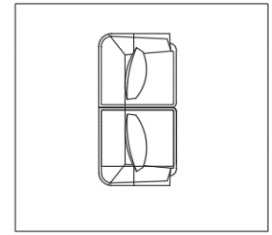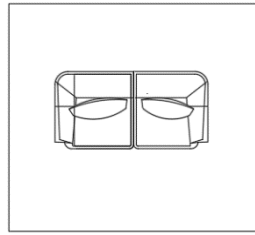


6. _____
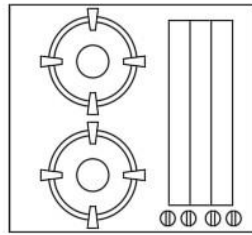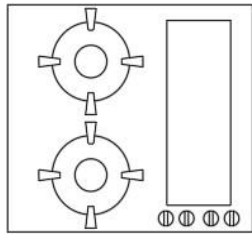


7._____
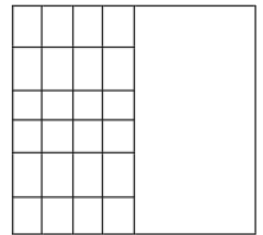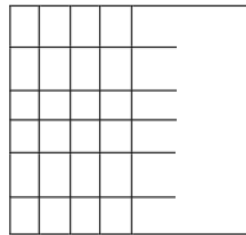


8. _____
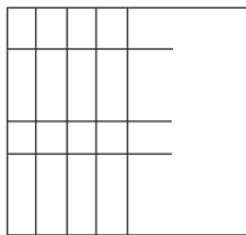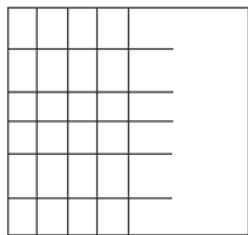


9._____
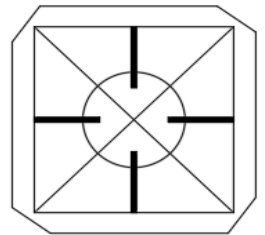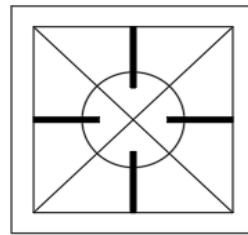


10. _____

# *What I Can Do*

**Drawing Problem**

**Directions.**
  a. Using your AutoCAD software, draw the objects below applying the right modifying commands.
  b. Save your work as <Last Name_First_Name_drawing Problem 1>.dwg

NOTE: If you don't have any AutoCAD Software and computer devices, you can draw the object below manually using the right tools. Place your drawing in a short bond paper. Place 1' margin on each side.



## Drawing Hints



1. 8 Sided Polygon       2. 4 Sided Polygons       3. Offset and Trim

1. Circle                2. Circle, 2P             3. Array, Offset, Trim
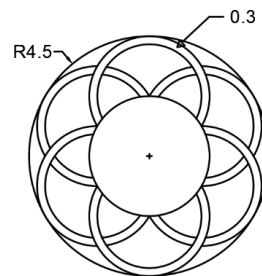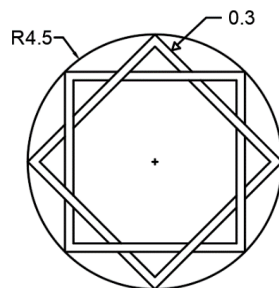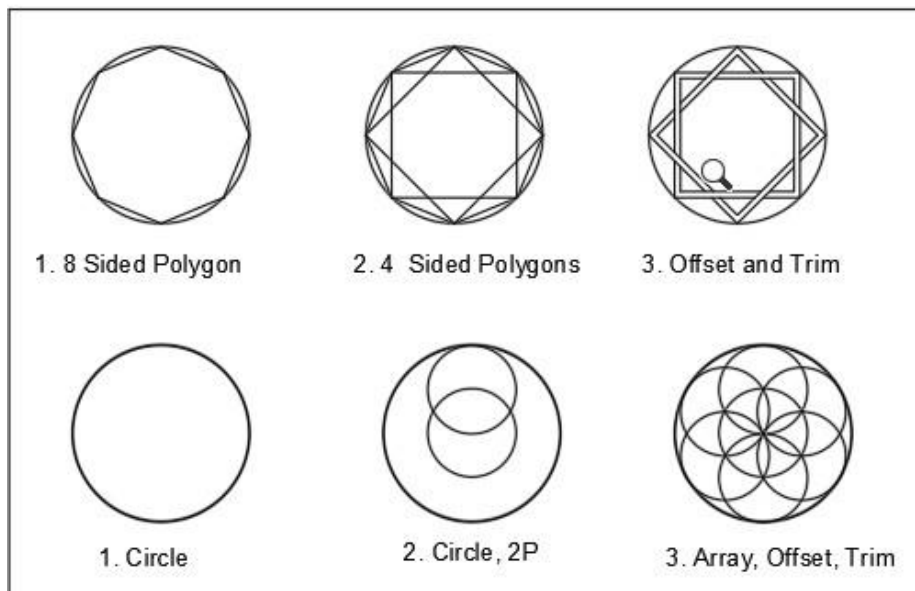
| Criteria | Levels of Assessment | | | | Score |
|---|---|---|---|---|---|
| | Excellent (10 pts) | Very satisfactory (8 pts) | Satisfactory (5 pts) | Needs Improvement (3 pt) | |
| **Followed the instructions** Followed the given instructions/procedure from start to finish, observed correct usage of 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 | | | | | |

# *Post-Assessment*

**Multiple Choice.**

**Directions:** Choose the letter of the best answer. Write the chosen letter on the answer sheet provided.

1. What is the modifying command that can be used to trim a part of an object?
   A. F           B. RO          C. TR          D. Erase
2. Which of the following modifying command can be used to create one or more duplicates of any drawing object/s which you have previously created?
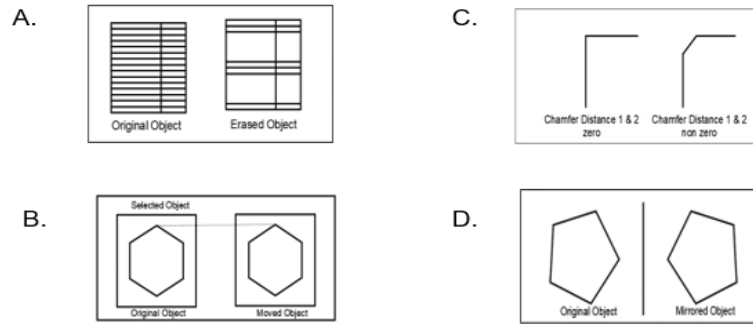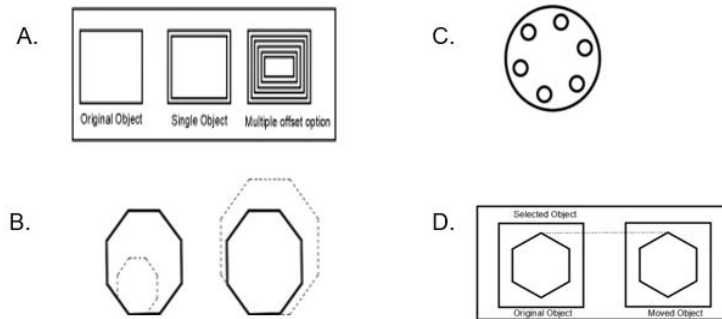   A. Copy        B. Erase        C. Move        D. Transfer
3. It is the one of the simplest AutoCAD commands.
   A. Cut         B. Delete        C. Erase        D. Trim
4. It allows you to mirror selected objects in your drawing by picking them and thendefining the position of an imaginary mirror line using two points.
   A. Fillet        B. Mirror        C. Offset        D. Scale
5. Using the _____command, you can duplicate existing objects in a rectangleor circular (polar) pattern.
   A. Array        B. Fillet        C. Offset        D. Scale
6. Which of the following commands creates a new object parallel to or concentric with a selected object?
   A. Array        B. Chamfer        C. Filler        D. Offset
7. Which of the following command allows an object or objects to be rotated about a point selected by the user?
   A. Copy        B. Move        C. Rotate        D. Scale
8. It is a command that enables you to create a chamfer between any two non-parallel lines.
   A. Chamfer        B. Fillet        C. Mirror        D. Offset
9. Which of the following command can be used to change the size of an objector group of objects?
   A. Explode        B. Trim        C. Scale        D. Stretch
10. You want to ungroup the object you drafted, what command breaks the compound object into its component objects?
    A. Break        B. Explode        C. Stretch        D. Separate

11. Which of the following illustrations below is a chamfer command?

A.



Original Object    Erased Object

C.



Chamfer Distance 1 & 2    Chamfer Distance 1 & 2
zero                      non zero

B.

Selected Object



Original Object    Moved Object

D.



Original Object    Mirrored Object

12. Which of the following illustrations below is the Offset command?

A.



Original Object    Single Object    Multiple offset option

C.



B.



D.

Selected Object



Original Object    Moved Object

13. Which of the following illustrations below is a polar array command?

A.



C.



B.



D.



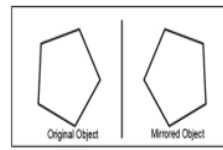14. Which of the following illustrations below is the Copy command?

A.



Original Object    Erased Object

C.

Selected Object



Original Object    Moved Object

B.



D.

15. Which of the following illustrations below is the Scale Command?

A.



Original Object    Erased Object

C.



Original Object    Mirrored Object

B.



D.



Original Object    Erased Object
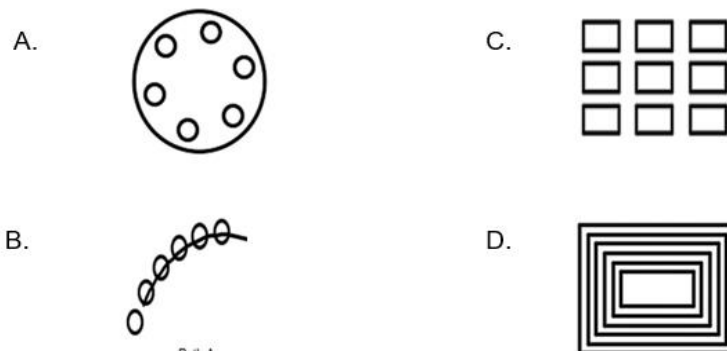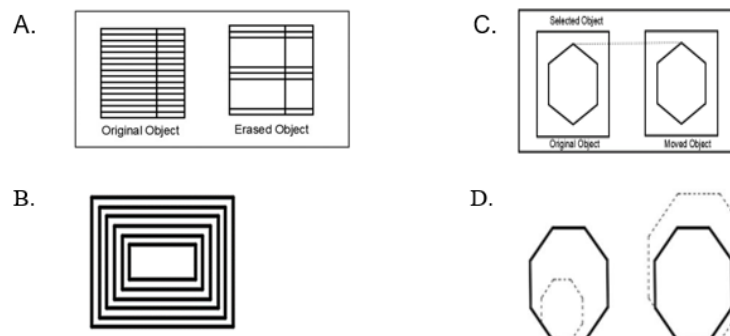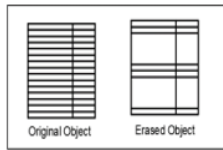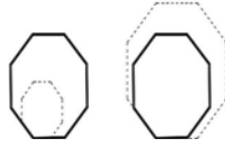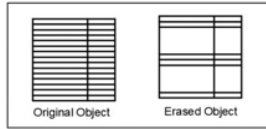


# *Additional Activity*

***Smile or Frown***
**Directions.** Draw ☺ if the statement given below is true. Draw ☹ if you think the statement is false. Write your answers on the answer sheet provided.

1. The Erase command is one of the hardest AutoCAD command and is one of the most used command.
2. The explode command breaks the compound object into its component objects.
3. The scale command is a command that can be used to change the size of an object or group of objects.
4. The mirror command allows you to mirror selected objects in your drawing by picking them and then defining the position of an imaginary mirror line using two points.
5. The fillet commands enable you to create a chamfer between any two non-parallel lines.
6. The move command allows an object or objects to be rotated to a point selected by the user.
7. The shortcut key of trim command is TR.
8. The offset command creates a new object parallel to or concentric with a selected object.
9. The array command duplicates objects/ entities using line, circle and rectangle options.
10. The shortcut key of fillet command is FL.

# *Answer Key*

## What I Know

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

## What's In

1. Rectangle
2. Polygon
3. Circle
4. Arc
5. Polyline

## What's New

answers may vary

## What's More

1. G
2. E
3. F
4. D
5. B
6. J
7. A
8. C
9. I
10. H

## What I Have Learned

1. Copy
2. Mirror
3. Polar
4. Fillet
5. Scale
6. Rotate
7. Offset
8. Trim
9. Erase
10. Chamfer

## What I Can Do

Performance output
will be evaluated
through given
rubrics

## Assessment

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

## Additional Activity

1. Frown
2. Smile
3. Smile
4. Smile
5. Frown
6. Frown
7. Smile
8. Smile
9. Smile
10. Frown

# *References*

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

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