

LEARNING OBJECTIVES

After completing this lesson, you will be able to:


1. Make an existing object larger or smaller proportionately
2. Stretch or compress an existing object.
3. Rotate an existing object to a specific angle.

LESSON 14

SCALE

The **SCALE** command is used to make objects larger or smaller proportionately. You may scale using a scale factor or a reference length. You must also specify a base point. The base point is a stationary point from which the objects scale.

1. Select the SCALE command using one of the following:

Ribbon = Home tab / Modify panel / 
or
Keyboard = SCALE <enter>

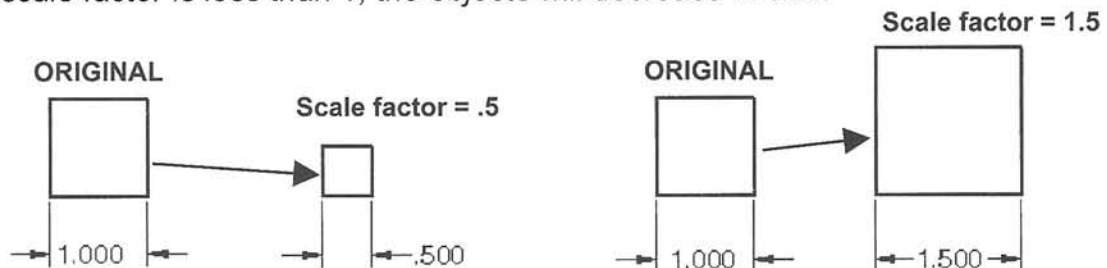
SCALE FACTOR

Command: `_scale`

2. Select objects: ***select the object(s) to be scaled***
3. Select objects: ***select more object(s) or <enter> to stop***
4. Specify base point: ***select the stationary point on the object***
5. Specify scale factor or [Copy/Reference]: ***type the scale factor <enter>***

If the scale factor is greater than 1, the objects will increase in size.

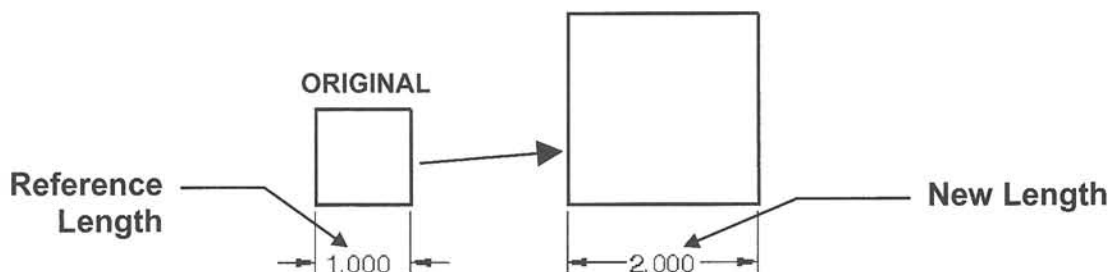
If the scale factor is less than 1, the objects will decrease in size.



REFERENCE option

Command: `_scale`

2. Select objects: ***select the object(s) to be scaled***
3. Select objects: ***select more object(s) or <enter> to stop***
4. Specify base point: ***select the stationary point on the object***
5. Specify scale factor or [Copy/Reference]: ***select Reference***
6. Specify reference length <1>: ***specify a reference length***
7. Specify new length: ***specify the new length***



COPY option - creates a duplicate of the selected object. The duplicate is directly on top of the original. The duplicate will be scaled. The Original remains the same.


STRETCH

The **STRETCH** command allows you to stretch or compress object(s). Unlike the Scale command, you can alter an objects proportion with the Stretch command. In other words, you may increase the length without changing the width and vice versa.

Stretch is a very valuable tool. Take some time to really understand this command. It will save you hours when making corrections to drawings.

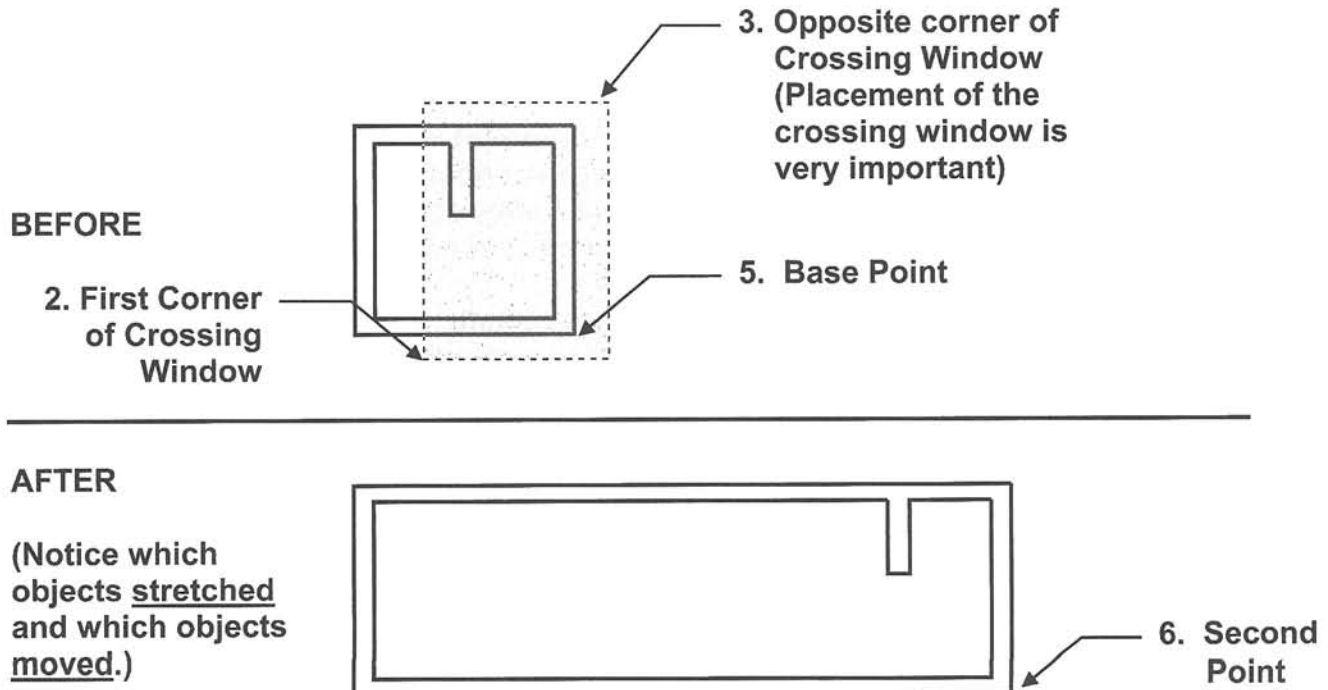
When selecting the object(s) you must use a **CROSSING** window. Objects that are crossed, will **stretch**. Objects that are totally enclosed, will **move**.

1. Select the STRETCH command using one of the following:

Ribbon = Home tab / Modify panel / 
or
Keyboard = S <enter>

Command: `_stretch`

2. Select objects to stretch by crossing-window or crossing-polygon...
Select objects: **select the first corner of the crossing window**
3. Specify opposite corner: **specify the opposite corner of the crossing window**
4. Select objects: **<enter>**
5. Specify base point or [Displacement] <Displacement>:
select a base point (where it stretches from)
6. Specify second point or <use first point as displacement>:
type coordinates or place location with cursor



ROTATE


The **ROTATE** command is used to rotate objects around a Base Point. (pivot point)

After selecting the objects and the base point, you will enter the rotation angle from its current rotation angle or select a reference angle followed by the new angle.

A **Positive** rotation angle revolves the objects **Counter- Clockwise**.

A **Negative** rotation angle revolves the objects **Clockwise**.

Select the ROTATE command using one of the following:

Ribbon = Home tab / Modify panel / 

or

Keyboard = RO <enter>

ROTATION ANGLE OPTION

Command: `_rotate`

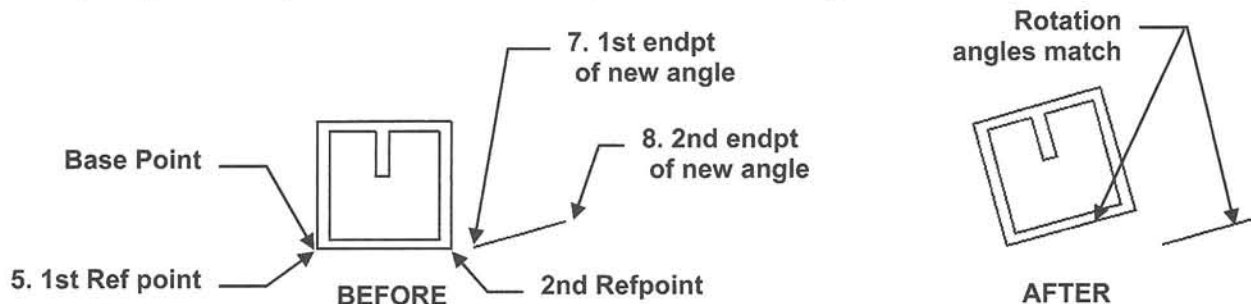
1. Current positive angle in UCS: `ANGDIR=counterclockwise ANGBASE=0`
Select objects: ***select the object to rotate.***
2. Select objects: ***select more object(s) or <enter> to stop.***
3. Specify base point: ***select the base point (pivot point).***
4. Specify rotation angle or [Copy/Reference]<0>: ***type the angle of rotation.***



REFERENCE OPTION

Command: `_rotate`

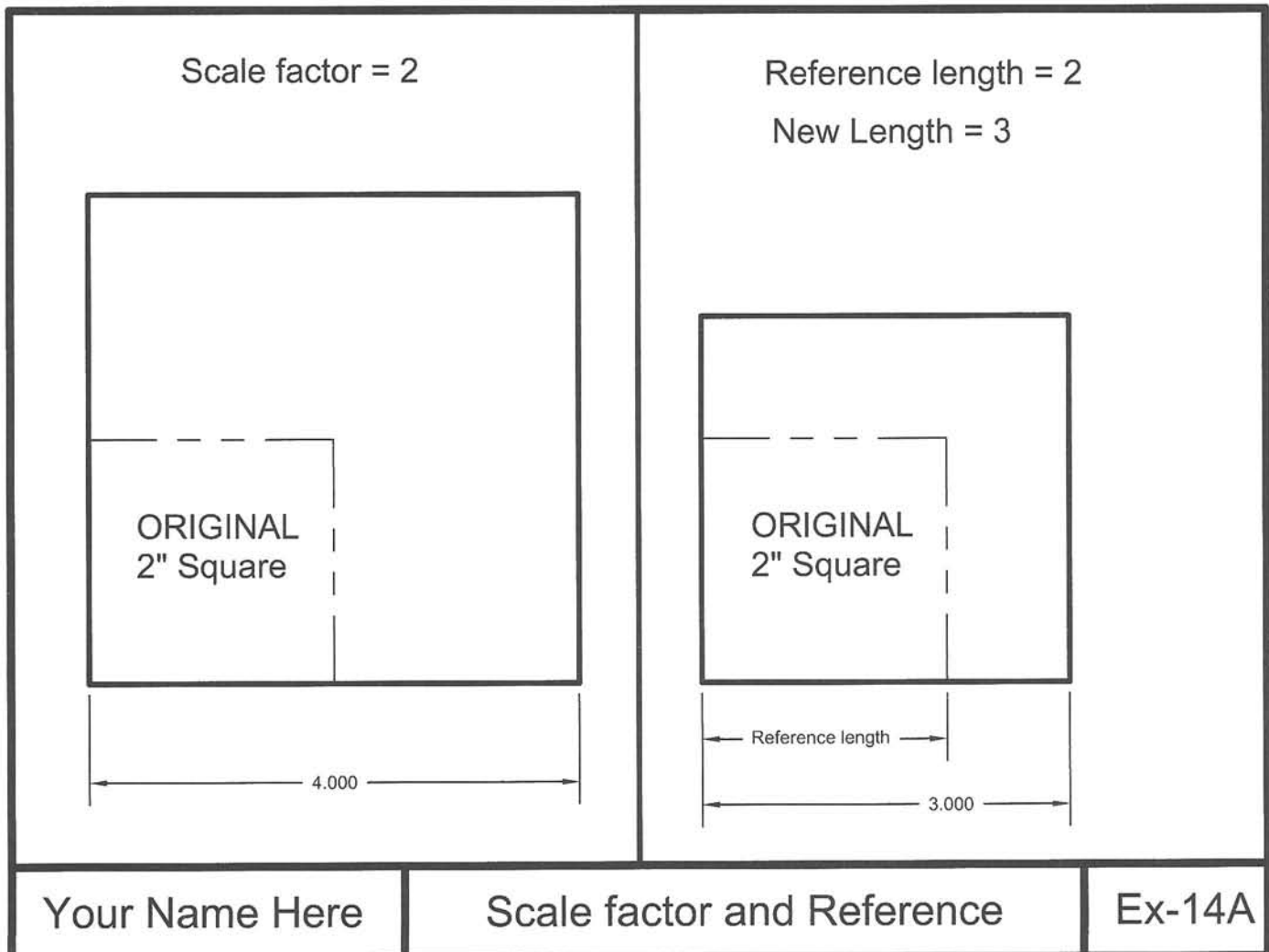
1. Current positive angle in UCS: `ANGDIR=counterclockwise ANGBASE=0`
Select objects: ***select the object to rotate.***
2. Select objects: ***select more object(s) or <enter> to stop.***
3. Specify base point: ***select the base point (pivot point).***
4. Specify rotation angle or [Reference]: ***select Reference.***
5. Specify the reference angle <0>: ***Snap to the reference object (1) and (2).***
6. Specify the new angle or [Points]: ***P <enter>.***
7. Specify first point: ***select 1st endpoint of new angle***
8. Specify second point: ***select 2nd endpoint of new angle***



EXERCISE 14A

INSTRUCTIONS:

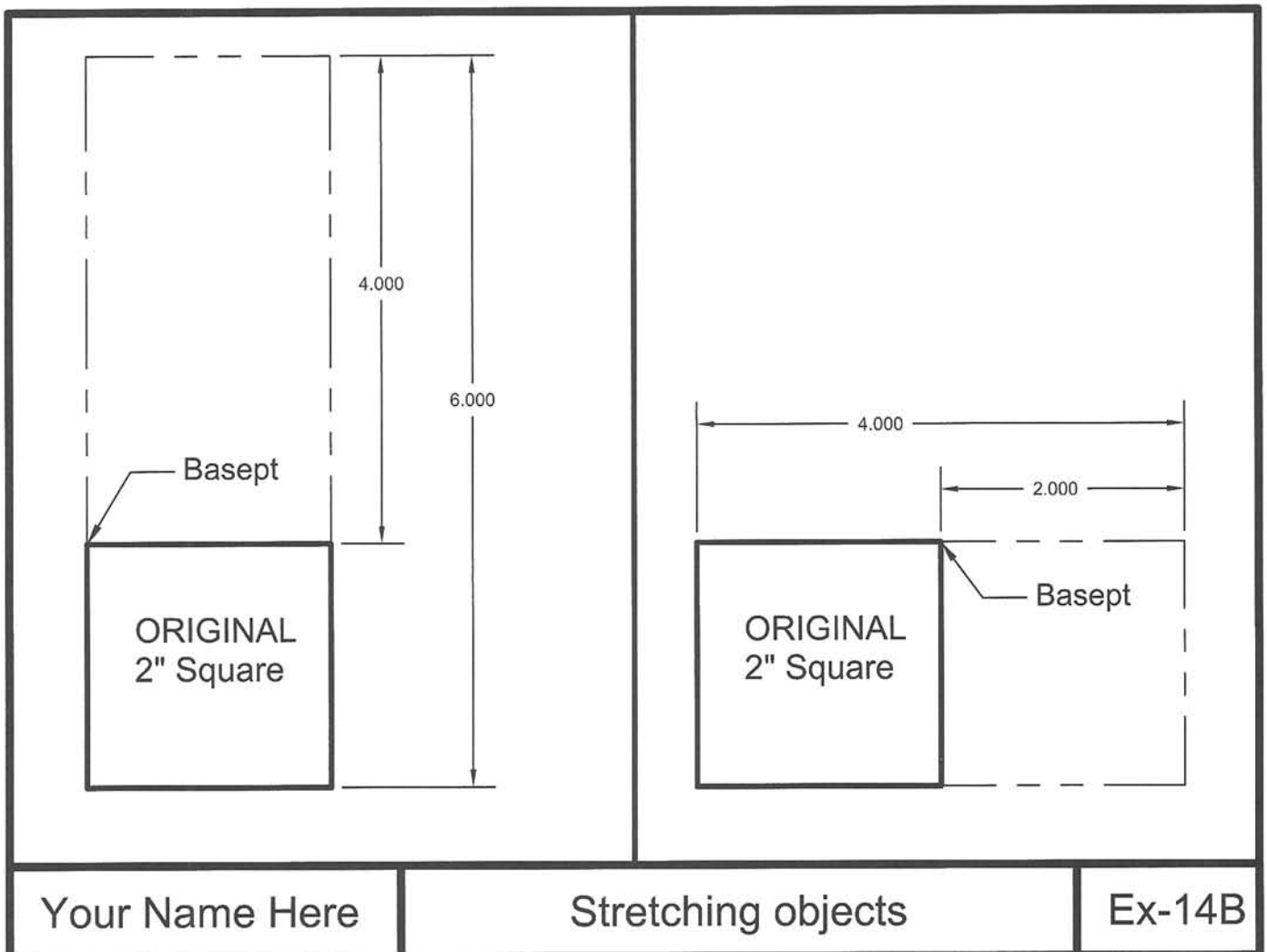
1. Start a **New** file using **Border A-2013.dwt**
2. Draw both 2" Squares shown below labeled "Original". Use layer Object Line.
3. Scale the original on the left using "scale factor" method.
4. Scale the original on the right using "scale Reference" method.
5. Edit the Title and Ex-XX by double clicking on the text. Do not erase and replace.
6. Do not dimension
7. Save as **EX14A**
8. Plot using Page Setup **Class Model A**



EXERCISE 14B

INSTRUCTIONS:

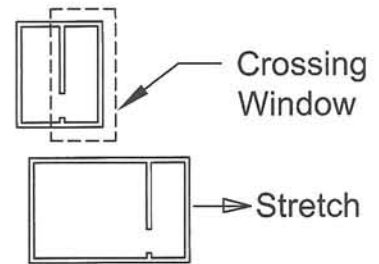
1. Start a **New** file using **Border A-2013.dwt**
2. Draw both 2" squares as shown below labeled as "Original". Use Layer Object Line.
3. Stretch each as shown.
4. Edit the Title and Ex-XX by double clicking on the text. Do not erase and replace.
5. Do not dimension
6. Save as **EX14B**
7. Plot using Page Setup **Class Model A**



EXERCISE 14C

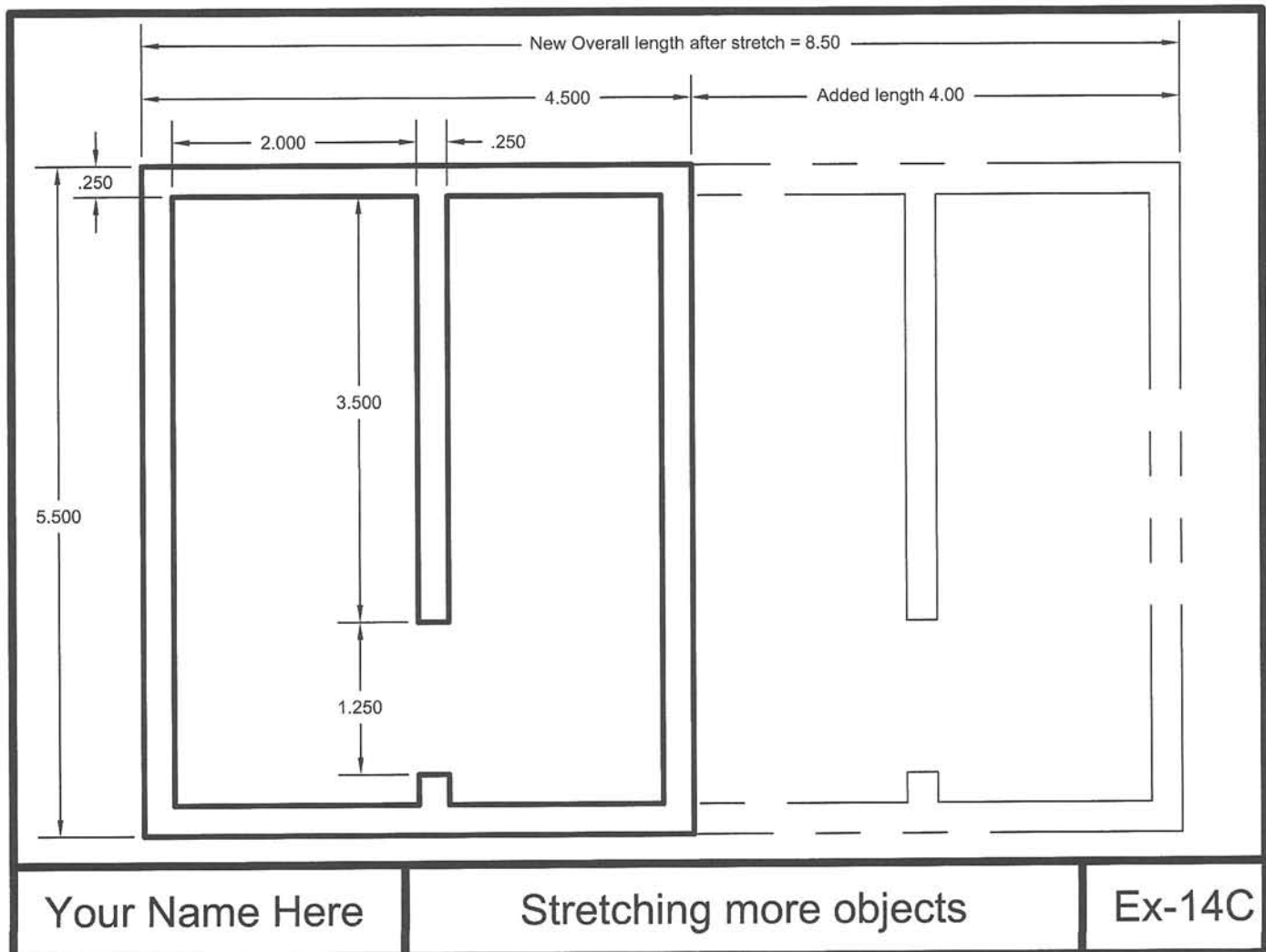
INSTRUCTIONS:

1. Start a **New** file using **Border A-2013.dwt**
2. Draw the Original shape on the left side of the border.
Use Layer Object Line.
3. Stretch the overall length to 8.50 as shown.
Notice the placement of the crossing window.
4. Edit the Title and Ex-XX by double clicking on the text. Do not erase and replace.
5. Do not dimension
6. Save as **EX14C**
7. Plot using Page Setup **Class Model A**



Note:

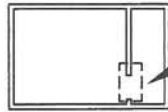
If this was an actual floorplan consider how the stretch command could be very helpful.



EXERCISE 14D

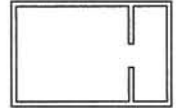
INSTRUCTIONS:

1. Open **EX14C**



Crossing Window

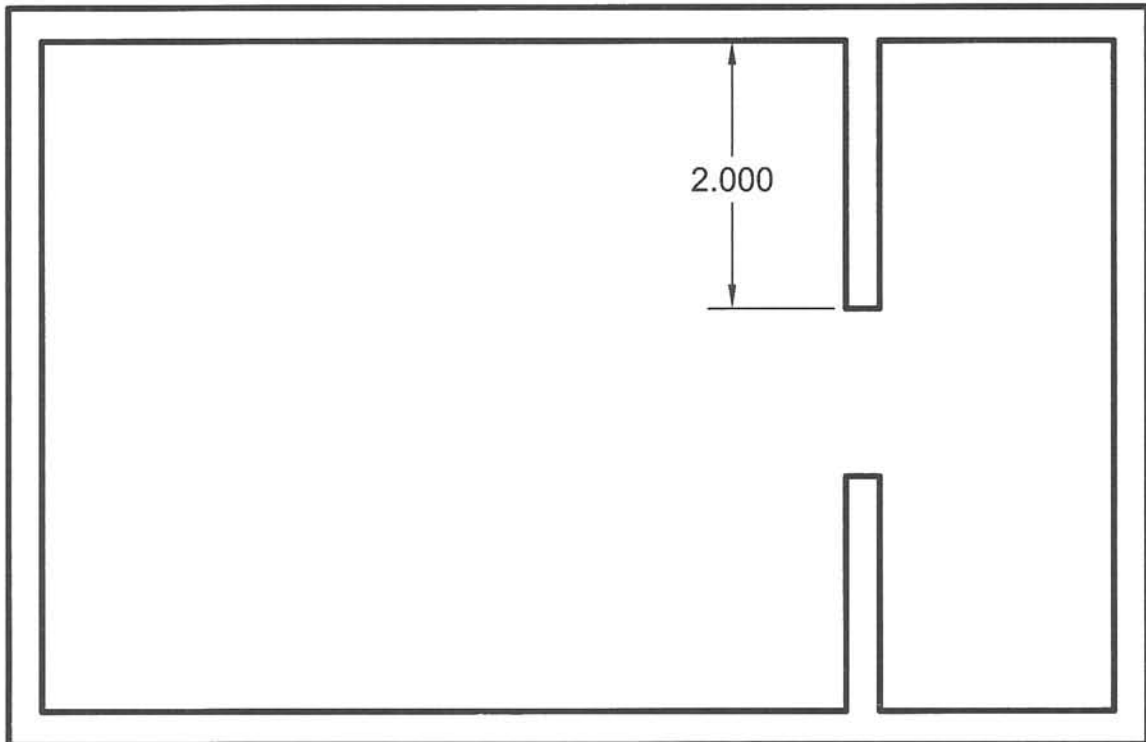
2. Move the opening to the new location using the Stretch command.
Notice the placement of the crossing window.



3. Edit the Title and Ex-XX by double clicking on the text. Do not erase and replace.
4. Do not dimension
5. Save as **EX14D**
6. Plot using Page Setup **Class Model A**

Note:

If this was an actual floorplan consider how the stretch command could be very helpful.



Your Name Here

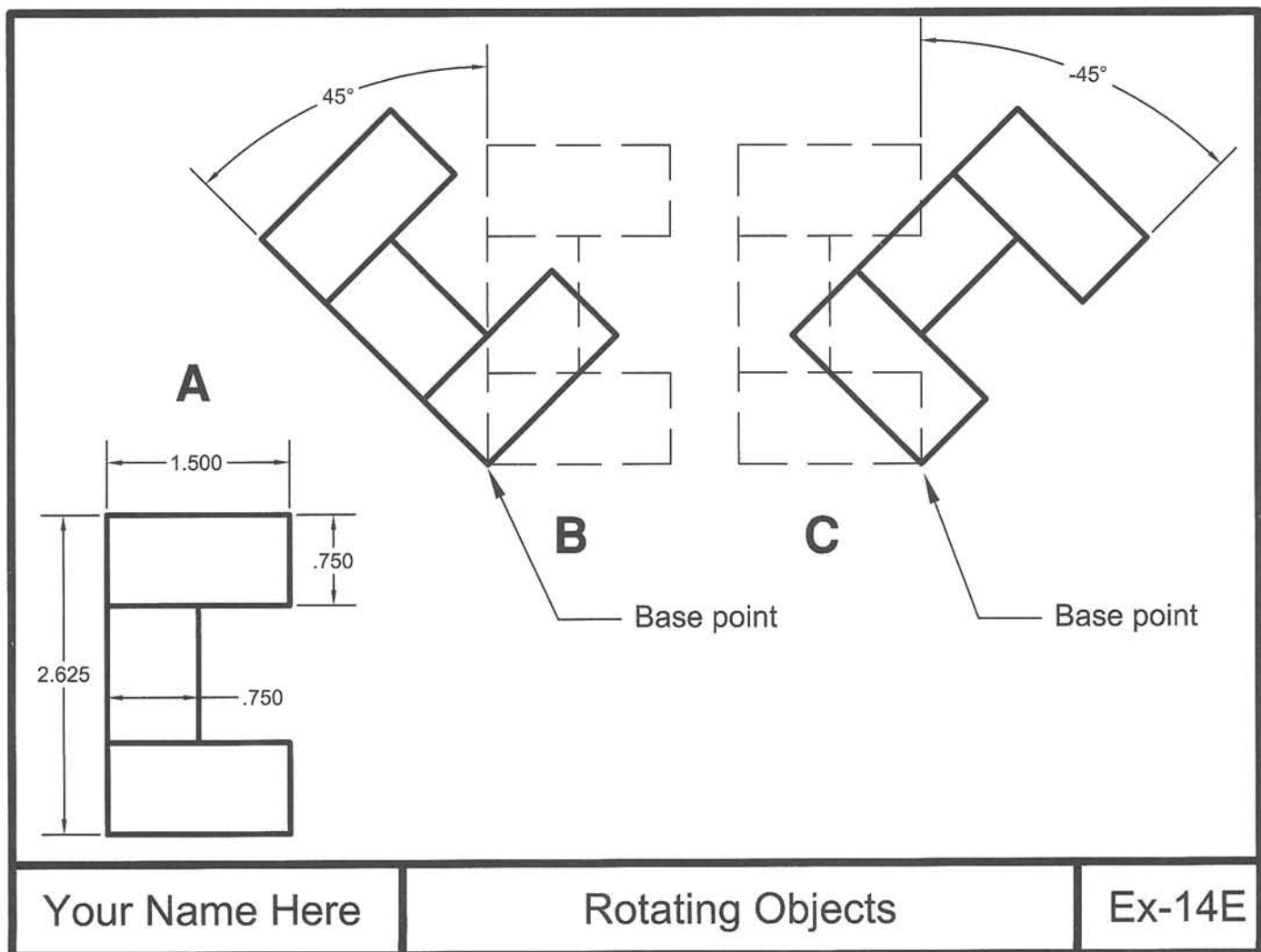
Moving a opening using Stretch

Ex-14D

EXERCISE 14E

INSTRUCTIONS:

1. Start a **New** file using **Border A-2013.dwt**
2. Draw the objects at position A. Use Layer Object Line.
3. Copy the objects to position B and C. (Shown as dashed lines)
4. Rotate the copies as shown. **Note: Base point is important**
5. Edit the Title and Ex-XX by double clicking on the text. Do not erase and replace.
6. Do not dimension
7. Save as **EX14E**
8. Plot using Page Setup **Class Model A**



NOTES: