

# 3.1 Duplicating Segments and Angles

## Objectives:

- I CAN duplicate a segment using a patty paper and a straightedge
- I CAN duplicate an angle using a patty paper and a straightedge or a straightedge and a compass
- .

# Sketch, Draw, Construct

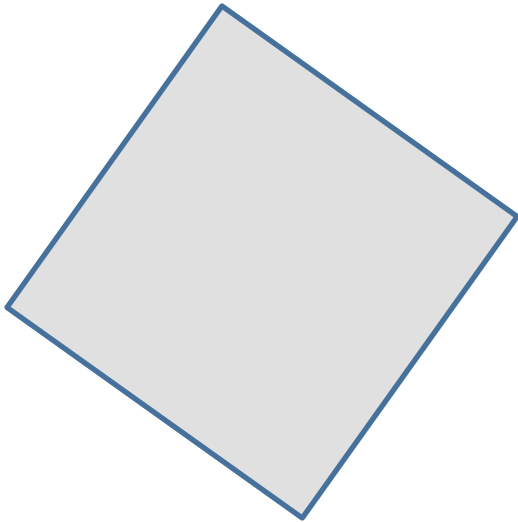
When you draw an equilateral triangle, you should use your geometry tools for accuracy. *You may use a protractor to measure angles and a ruler to measure the sides.*

When you sketch an equilateral triangle, you freehand a triangle that looks like an equilateral triangle. *No geometry tools needed.*

When you construct an equilateral triangle with a compass and straightedge, you don't rely on measurements from a protractor or a ruler. *This guarantees that your triangle is equilateral.*

# Duplicating a Segment

- With Patty Paper



# Duplicating a Segment

- With Compass and Straight Edge

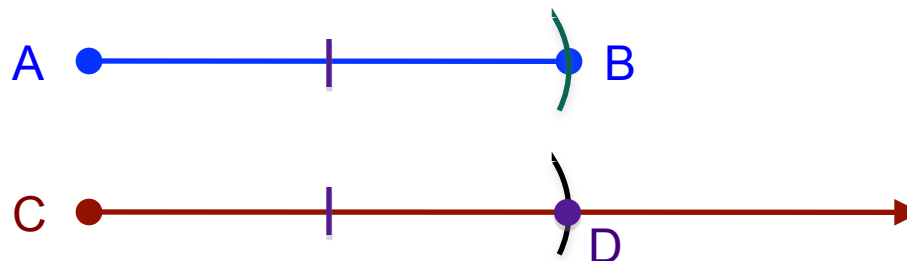
**Steps Using a Compass and Straightedge:**

1. Draw a new point  $C$ .
2. Use the compass to measure the distance from  $A$  to  $B$ .
3. Place the center of the compass on  $C$  and swing the edge to create a mark for the new point  $D$ .
4. Connect  $C$  and  $D$ .



# Construction 1: Copying a Segment

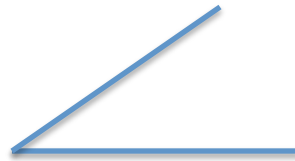
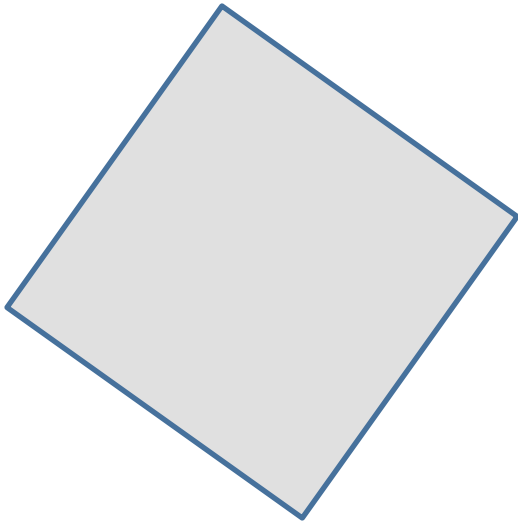
1. Draw a line segment with endpoints  $A$  and  $B$ .
2. Draw a ray with endpoint  $C$  so that the ray is longer than the segment.
3. Put the point of the compass on pt.  $A$  and stretch the compass until the pencil reaches pt.  $B$ . The compass now has a length of  $AB$ . Draw an arc thru pt.  $B$  to check.
4. Without changing the compass, put the point on pt.  $C$  and make an arc that intersects the ray.
5. Label the point of intersection  $D$  so that  $AB=CD$ .



<http://www.mathopenref.com/constcopysegment.html>

# Duplicating an Angle

- With Patty Paper

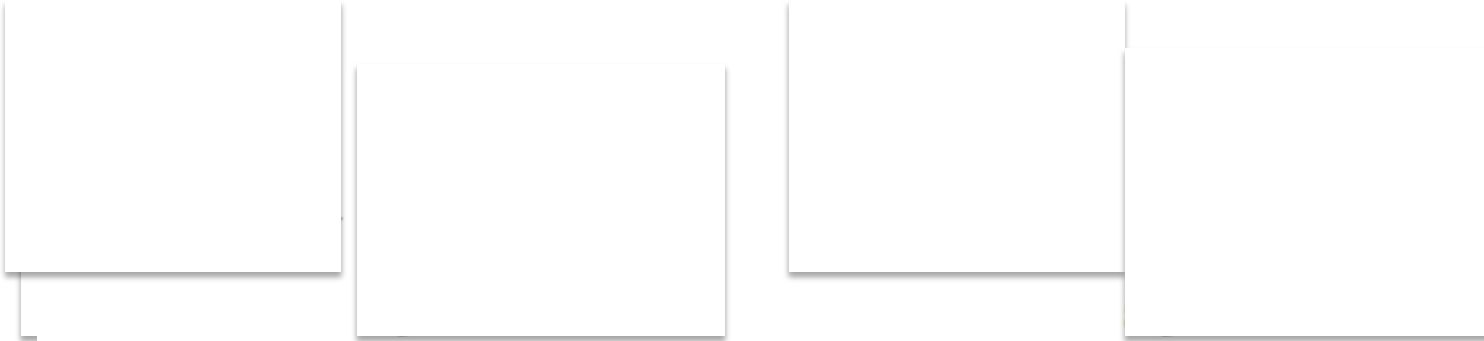


# Duplicating an Angle

- With Compass and Straight Edge

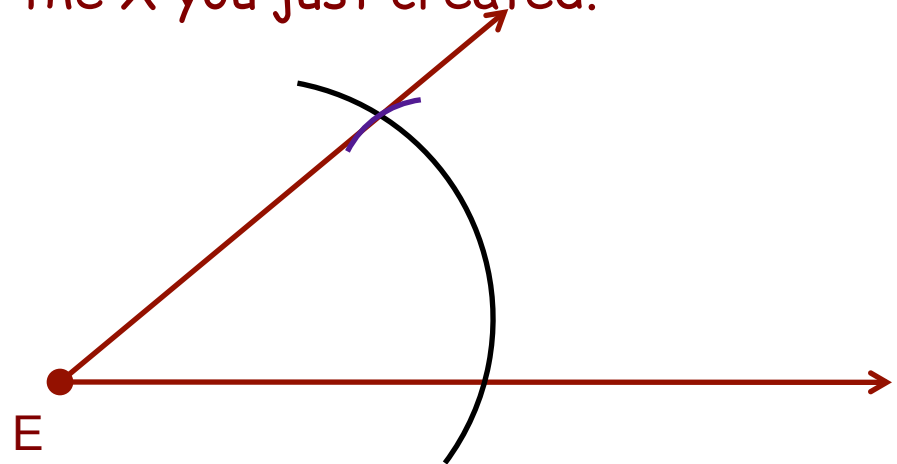
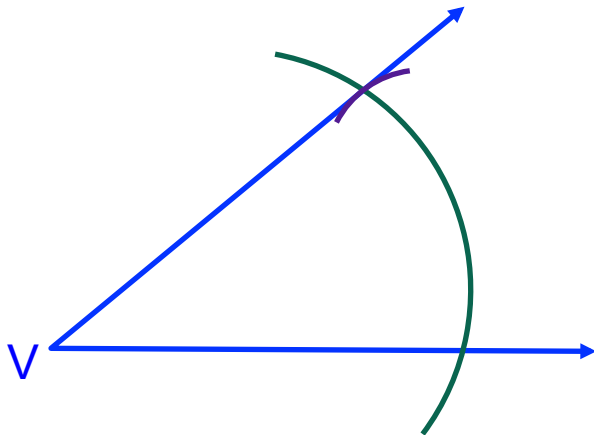
## Steps Using a Compass and Straightedge:

1. Place the point of the compass on  $E$ . Measure an arc across the width of the angle.
2. Create ray  $G$  and mark with the same arc.
3. Place the point of the compass where the arc meets ray  $EF$  and measure the arc that meets ray  $ED$ .
4. Duplicate the arc from ray  $G$  to the other side of the angle.



# Construction 2: Copying an Angle

1. Draw an angle with vertex  $V$ .
2. Draw a long ray with endpoint  $E$ .
3. Put the point of the compass on  $V$  and stretch the compass as far as you like. Then draw an arc that crosses both sides of the angle.
4. Without changing the compass, put the point on pt.  $E$  and make an arc that intersects the ray and is as large as the first one.
5. Use the compass to measure the distance between the two  $X$ 's on angle  $V$ . Without changing the compass, put the point on the intersection of the arc and ray  $E$ . Make an arc across the large arc.
6. Draw the ray that connects  $E$  to the  $X$  you just created.



<http://www.mathopenref.com/constcopyangle.html>



Draw a large acute triangle on the top half of your paper. Duplicate it on the bottom half using your compass and straightedge. Do not erase your construction marks, so others can see your method.