

*Important Concepts . . .*

# Preview Review



**Mathematics    Grade 7**  
**W3 - Lesson 3: Line Segments**

## Important Concepts of Grade 7 Mathematics

W1 - Lesson 1 .....	Divisibility Rules
W1 - Lesson 2 .....	Decimal Numbers
W1 - Lesson 3 .....	Fractions
W1 - Lesson 4 .....	Improper Fractions, Mixed Numbers, Percents, and Decimals
W1 - Lesson 5 .....	Integers, Number Lines, and Sequencing
W1 - Quiz	
W2 - Lesson 1 .....	Table of Values and Graphing Linear Equations
W2 - Lesson 2 .....	Modeling Expressions, Equations, and the Preservation of Equality
W2 - Lesson 3 .....	Algebra and Linear Equations
W2 - Lesson 4 .....	Statistics
W2 - Lesson 5 .....	Circle Graphs and Calculating Probability
W2 - Quiz	
W3 - Lesson 1 .....	Circles
W3 - Lesson 2 .....	Area of Triangles and Parallelograms
W3 - Lesson 3 .....	Line Segments
W3 - Lesson 4 .....	Parts and Plotting on a Cartesian Plane
W3 - Lesson 5 .....	Transformations
W3 - Quiz	

## Materials Required

Math Set  
Calculator

**No Textbook  
Required**

**This is a stand-  
alone course.**

Mathematics Grade 7

Version 6

Preview/Review W3 - Lesson 3

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Publisher: Alberta Distance Learning Centre

Written by: Sandy

Reviewed by: Barb Philips

Project Coordinator: Donna Silgard

Preview/Review Publishing Coordinating Team:

Laura Renkema and Nicole McKeand



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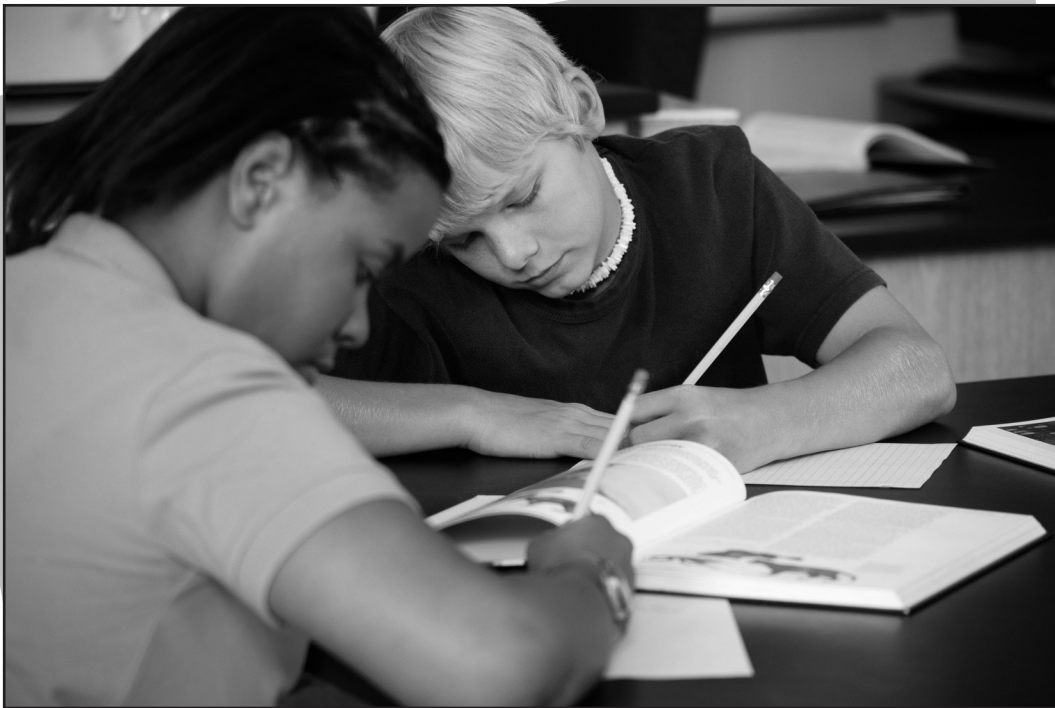
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# **Preview/Review Concepts for Grade Seven Mathematics**



***W3 – Lesson 3:***

***Line Segments***



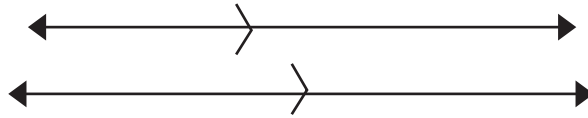
## W3 – Lesson 3: Line Segments

### Objective:

- I can identify and construct parallel line segments.*

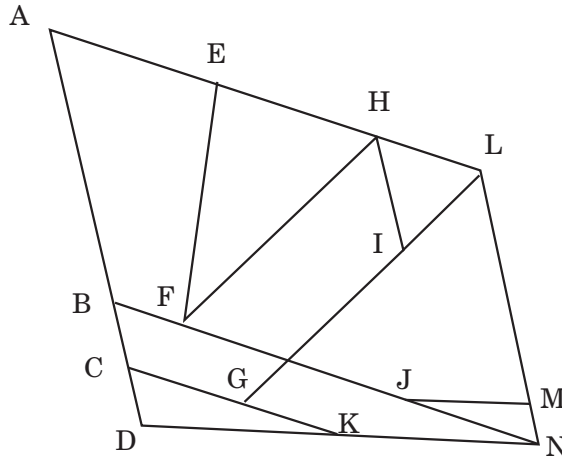
### Parallel line segments

**Parallel lines** are lines on a flat surface that are always the same distance apart and will never intersect..



### Practice:

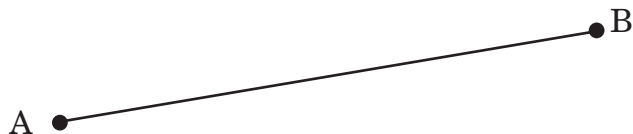
- Use the diagram to answer the following questions.



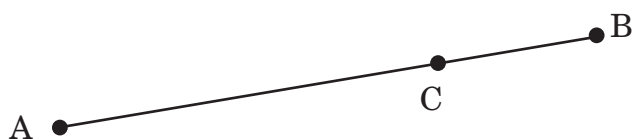
- What is a line segment that is parallel to  $\overline{AD}$ ?
- What is a line segment that is parallel to  $\overline{HF}$ ?
- What is a line segment that is parallel to  $\overline{DN}$ ?
- What is a line segment that is parallel to  $\overline{BN}$ ?

## Constructing parallel line segments using a protractor

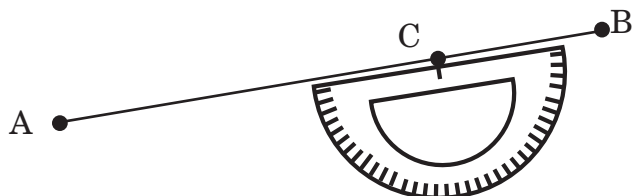
Step 1: Draw any line segment called  $\overline{AB}$  ( $\overline{AB}$ )



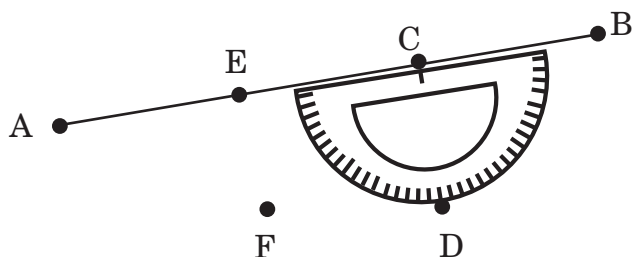
Step 2: Choose a point along  $\overline{AB}$  called point C.



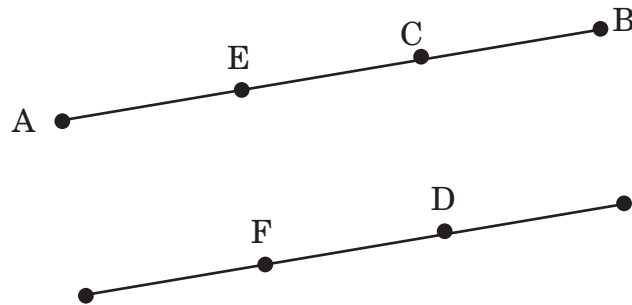
Step 3: Use a protractor to mark a point D  $90^\circ$  from point C.



Step 4: Choose another point along  $\overline{AB}$  called point E, use a protractor to mark a point F  $90^\circ$  from point E.



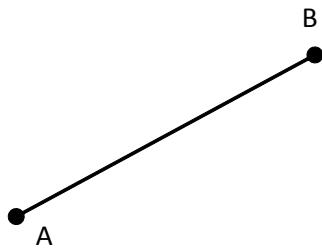
Step 5: Draw a line through points D and F.  $\overline{DF}$  is parallel to  $\overline{AB}$ .



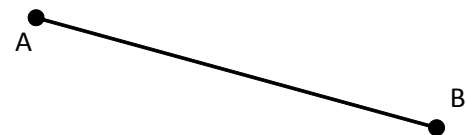
### Practice:

Use a protractor to draw a line segment  $\overline{DF}$  parallel to  $\overline{AB}$ .

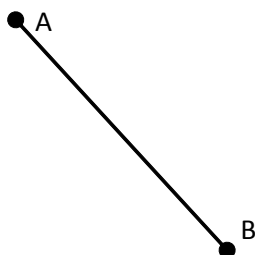
a.



b.



c.



d.

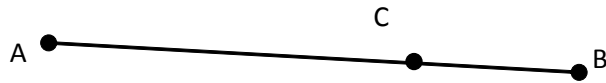


## Constructing parallel line segments using a compass

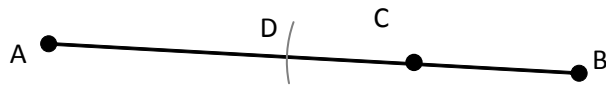
Step 1: Draw a line segment called  $\overline{AB}$



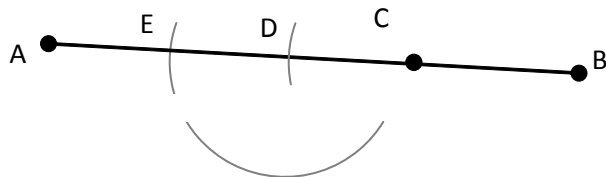
Step 2: Choose a point along  $\overline{AB}$  called point C.



Step 3: Place a compass on point C, draw an arc on  $\overline{AB}$  called D (do not change the angle of the compass)

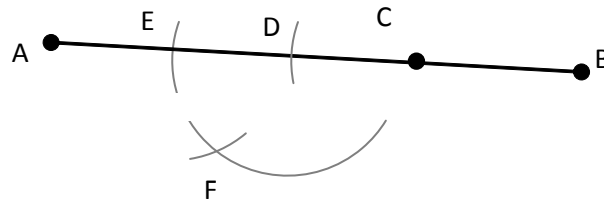


Step 4: Place a compass on point D, draw another arc on  $\overline{AB}$  called point E. Draw a second large arc below  $\overline{AB}$ . (Do not change the angle of the compass.)

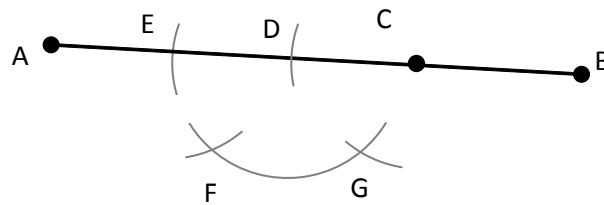




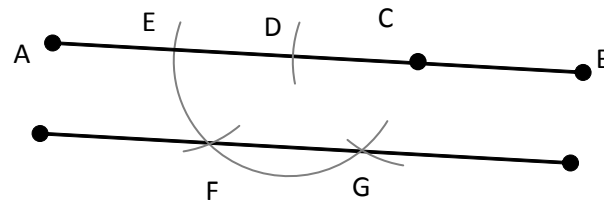
Step 5: Place a compass on Point E, draw an arc below intersecting the large arc, and label this Point F.



Step 6: Place a compass on Point C, draw an arc below intersecting the large arc, and label this Point G.



Step 7: Draw a line connecting point F and G.  $\overline{FG}$  is parallel to  $\overline{AB}$ .



### Practice:

Use a compass to draw a line segment  $\overline{FG}$  parallel to  $\overline{AB}$ . Show your work.

a.



b.

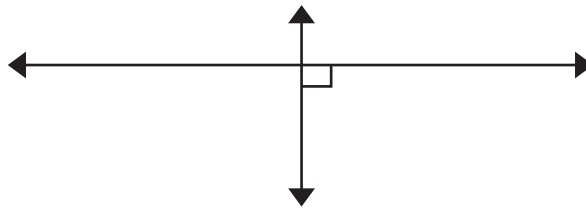


**Objective:**

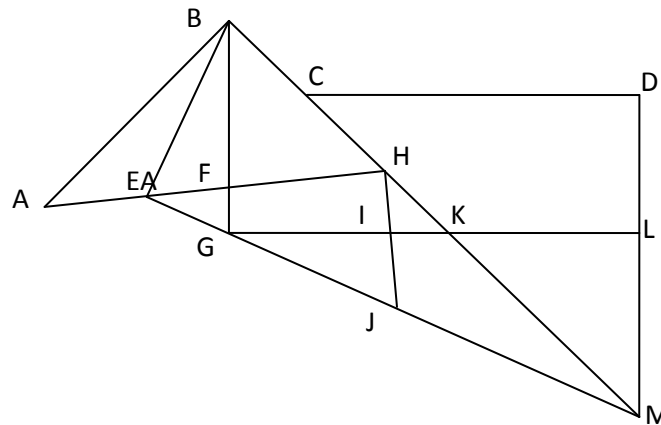
- *I can identify and construct perpendicular line segments.*

**Perpendicular line segments**

**Perpendicular lines** intersect, or cross, at right angles (90 degrees)..

**Practice:**

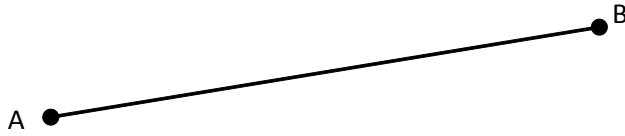
Use the diagram to answer the following questions.



- What is a line segment that is perpendicular to  $\overline{BM}$ ?
- What is a line segment that is perpendicular to  $\overline{AH}$ ?
- What is a line segment that is perpendicular to  $\overline{BG}$ ?
- What is a line segment that is perpendicular to  $\overline{CD}$ ?

## Constructing perpendicular line segments using a protractor

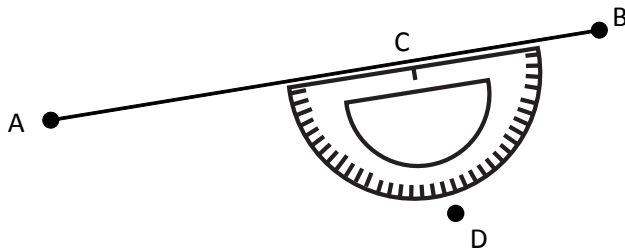
Step 1: Draw any line segment called AB ( $\overline{AB}$ ).



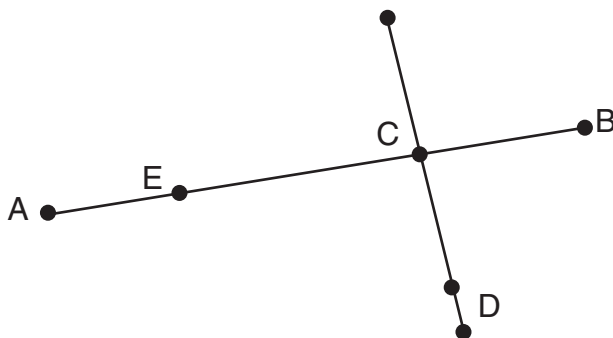
Step 2: Choose a point along AB called point C.



Step 3: Use a protractor to mark a point D,  $90^\circ$  from point C.



Step 4: Draw a line that passes through point C and D.  
CD is perpendicular to  $\overline{AB}$ .



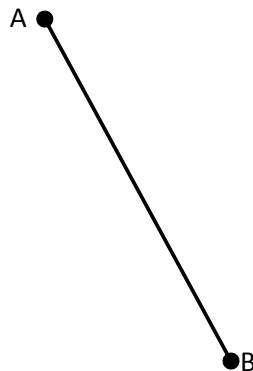
**Practice:**

Use a protractor to draw a line segment  $\overline{CD}$  perpendicular to  $\overline{AB}$ . Show your work.

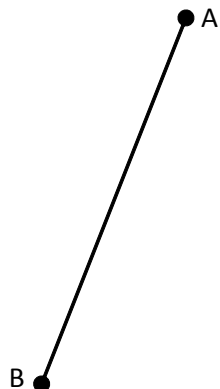
a.



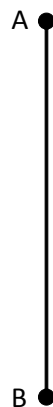
b.



c.



d.



## Constructing perpendicular line segments using a compass

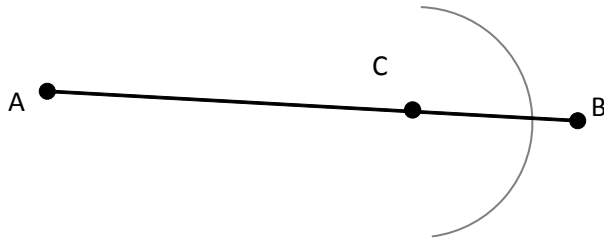
Step 1: Draw a line segment called  $\overline{AB}$  ( $\overline{AB}$ ).



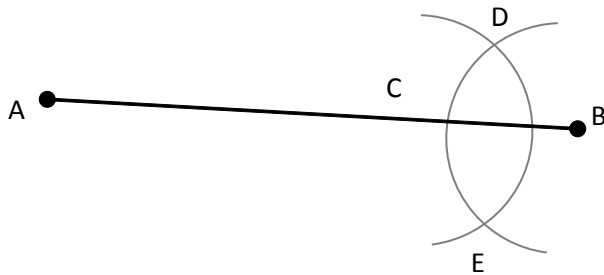
Step 2: Choose a point along  $\overline{AB}$  called point C.



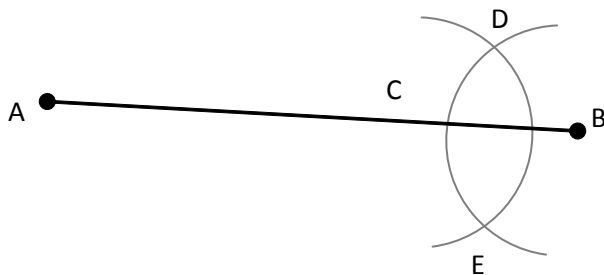
Step 3: Place a compass on point C, draw a large arc on  $\overline{AB}$ .



Step 4: Place a compass on point B, draw another large arc on  $\overline{AB}$ . Label the points where the arcs intersect points D and E.



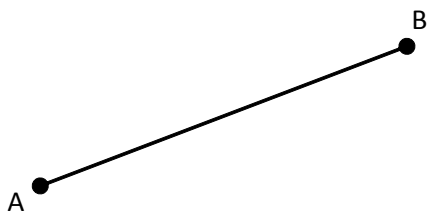
Step 5: Draw a line through points D and E.  $\overline{DE}$  is parallel to  $\overline{AB}$ .



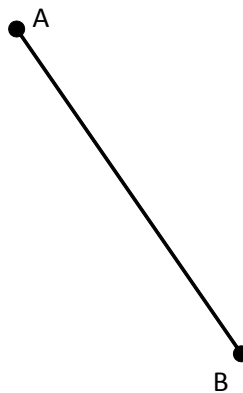
**Practice:**

Use a compass to draw a line segment  $\overline{DE}$  perpendicular to  $\overline{AB}$ . Show your work.

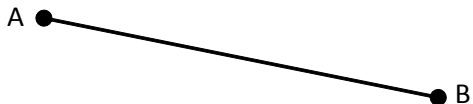
a.



b.



c.



d.

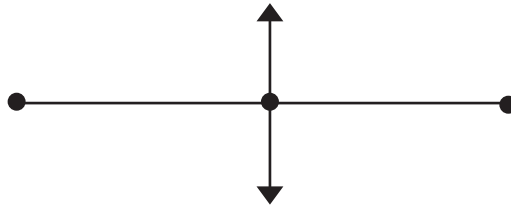


**Objective:**

- I can construct perpendicular and angle bisectors.*

**Perpendicular bisectors**

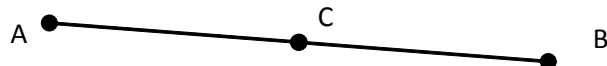
When a line segment is divided into two equal parts it has been bisected. A **Perpendicular Bisector** is a perpendicular line that crosses that middle point..

**Constructing a perpendicular bisector**

Step 1: Draw a line segment called AB ( $\overline{AB}$ ).



Step 2: Measure the length of  $\overline{AB}$  using a ruler. Mark the midpoint called point C.

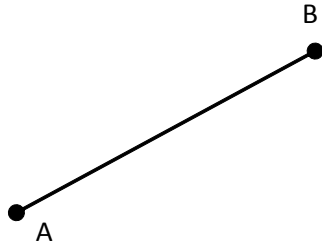


Step 3: Construct a perpendicular line from point C using either a protractor or a compass.

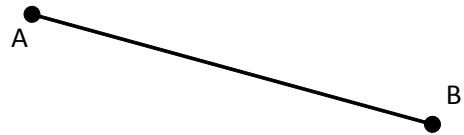
**Practice:**

Construct a perpendicular bisector. Show your work

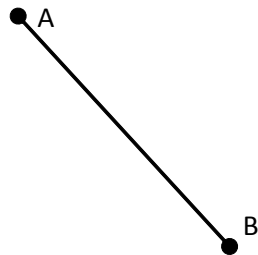
a.



b.



c.



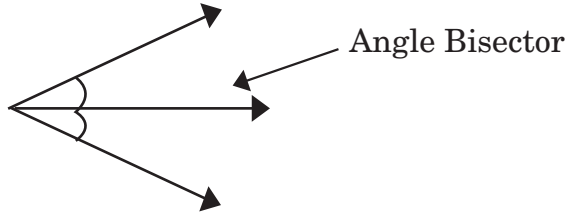
d.





## Angle bisectors

An **Angle Bisector** is a line segment that cuts an angle exactly in half.

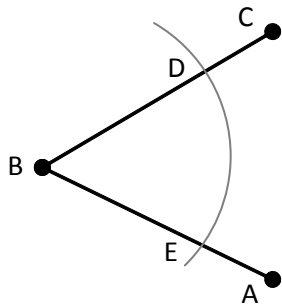


### Practice:

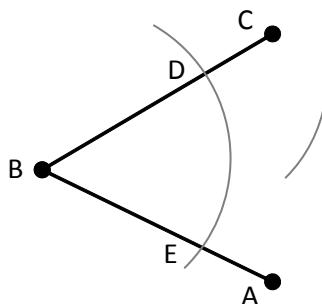
1. If an angle measured  $60^\circ$ , the bisected angles would measure \_\_\_\_\_ $^\circ$
2. If an angle measured  $90^\circ$ , the bisected angles would measure \_\_\_\_\_ $^\circ$
3. If an angle measured  $52^\circ$ , the bisected angles would measure \_\_\_\_\_ $^\circ$

### Constructing an angle bisector

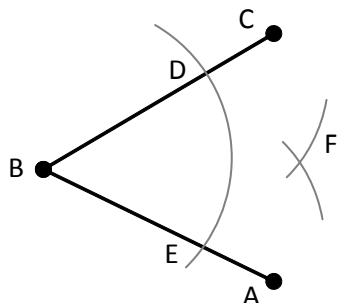
Step 1: Place the compass on the vertex of angle ABC ( $\angle ABC$ ) and draw a large arc intersecting both arms of the angle, points D and E.



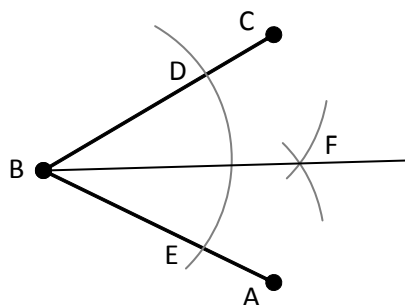
Step 2: Place the compass on point D. Draw an arc near the middle of the angle. Do not change the distance of the compass for the next step.



Step 3: Place the compass on point E. Draw an arc intersecting the other arc near the middle of the angle, point F.



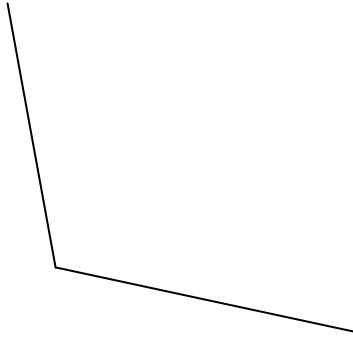
Step 4: Draw a line from B to F to finish the angle bisector.



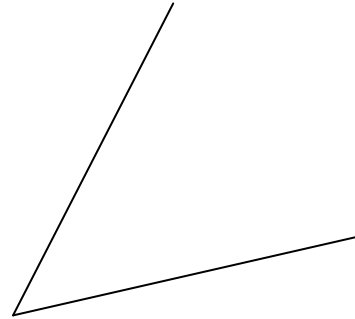
**Practice:**

Construct an angle bisector. Show your work.

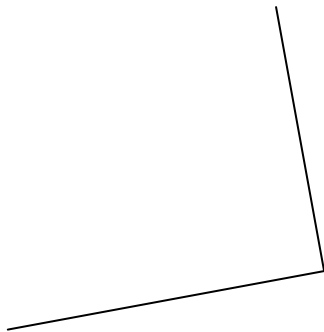
a.



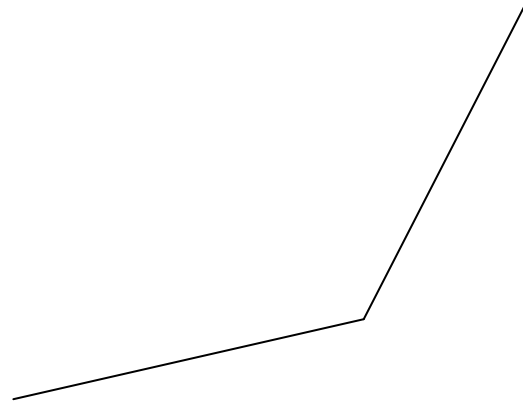
b.



c.



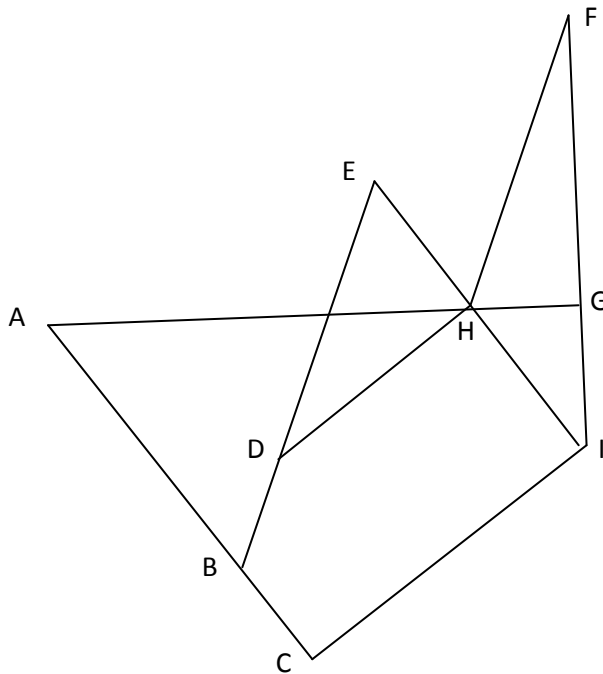
d.



## Summary and Practice:

- Using what you've learned, answer the following questions.

1. Use the diagram to answer the following questions.



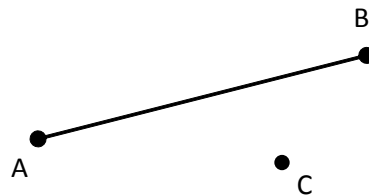
- What is a line segment that is parallel to  $\overline{AC}$ ?
- What is a line segment that is perpendicular to  $\overline{DH}$ ?
- What is a line segment that is parallel to  $\overline{BE}$ ?
- What is a line segment that is perpendicular to  $\overline{AC}$ ?
- Are any segments are not parallel to any other line segments?
- What is the relationship between  $\overline{AG}$  and  $\overline{FI}$ ?

2. Jim says a straight stretch of railroad tracks is the perfect example of parallel lines. Is Jim correct? Why or why not?

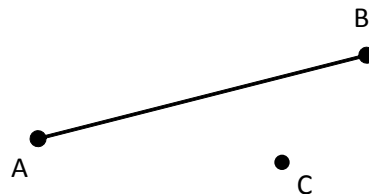


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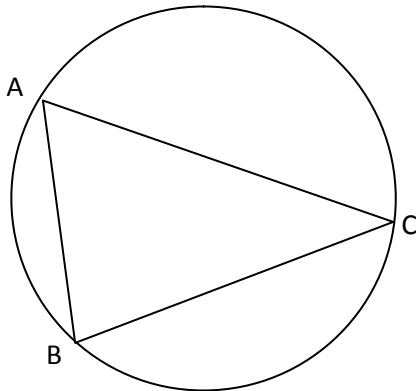
3. What is the easiest way to check if two lines are perpendicular?
4. Draw a line segment passing through point C that is parallel to  $\overline{AB}$ . Show your work



5. Draw a line segment passing through point C that is perpendicular to  $\overline{AB}$ . Show your work



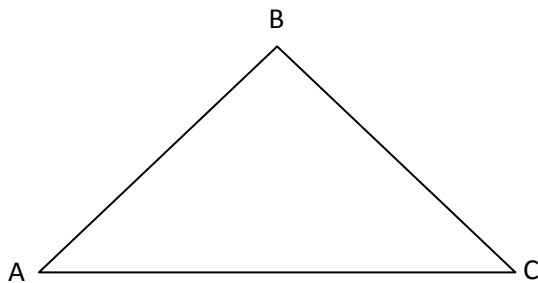
6. Consider triangle ABC.



Draw the perpendicular bisectors of each side of the triangle. Show your work.

Where do the perpendicular bisectors intersect?  
How do you know?

7. Consider triangle ABC.



- a. Bisect angle B. Show your work.
- b. Draw the perpendicular bisector of  $\overline{AC}$ .
- c. What do you notice about the bisectors?

- d. Would you get the same results from angle A and  $\overline{AC}$ ?

- e. What kind of triangle would have all three perpendicular bisectors also bisecting the opposite angle?





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