Important Concepts . . .

Preview Review

Mathematics Grade 7 TEACHER KEY

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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Preview/Review Concepts for Grade Seven Mathematics

Teacher Key

W3 – Lesson 3:

Line Segments

Introductory Information for Teachers

Preview/Review courses are aimed mainly at students who have completed the regular course but who need to review some of the material before beginning the next grade. Other students may find Preview/Review courses useful in preparing for the new concepts they will study in their next grade.

No Preview/Review course is intended to replace the regular course because each covers only what the writers have decided are the top 15 concepts from the Program of Studies for that course.

Preview/Review materials are intended for use by teachers and students in one-subject and one-grade classrooms. This Preview/Review course contains fifteen lessons in three sections. Each section has five lessons. A short quiz is provided at the end of each section to test student knowledge of the material studied. In a classroom the course will likely be completed in three weeks.

This Preview/Review course is written to be stand-alone. There is no textbook required.

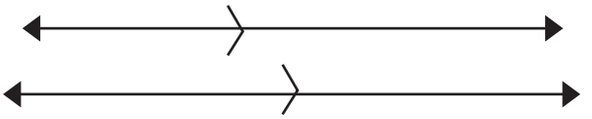
W3 – Lesson 3: Line Segments

Objective:

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

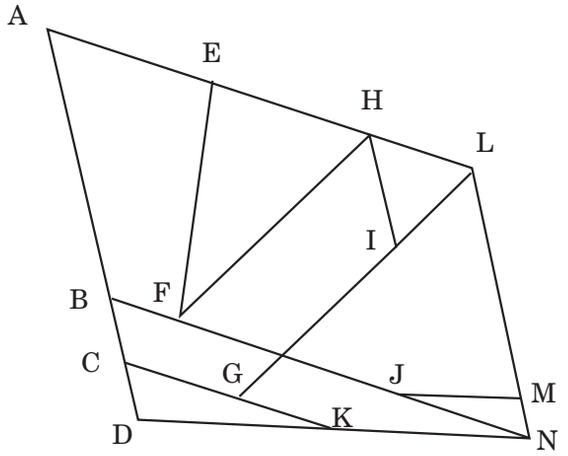
Parallel line segments

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



Practice:

1. Use the diagram to answer the following questions.



a. What is a line segment that is parallel to $\overline{AD}$?

$\overline{HI}$ or $\overline{LM}$ or $\overline{LN}$ or $\overline{MN}$

b. What is a line segment that is parallel to $\overline{HF}$?

$\overline{LG}$

c. What is a line segment that is parallel to $\overline{DN}$?

$\overline{JM}$

d. What is a line segment that is parallel to $\overline{BN}$?

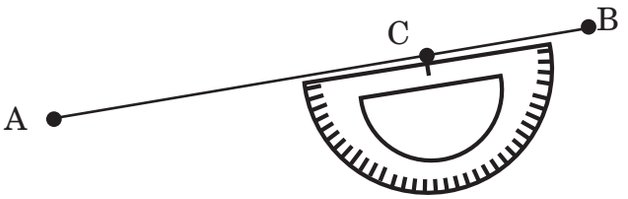
$\overline{AL}$ or $\overline{CK}$

Constructing parallel line segments using a protractor

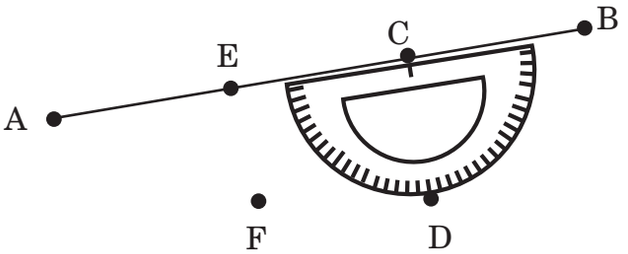
Step 1: Draw any line segment called AB ($\overline{AB}$)

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

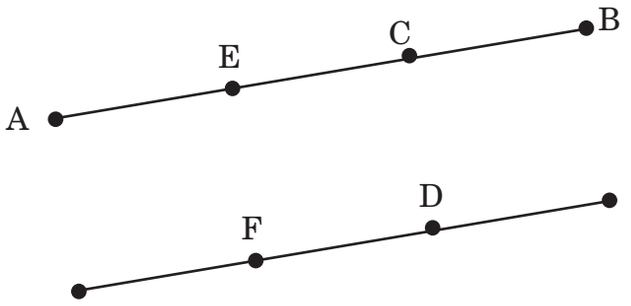
Step 3: Use a protractor to mark a point D 90° from point C.



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



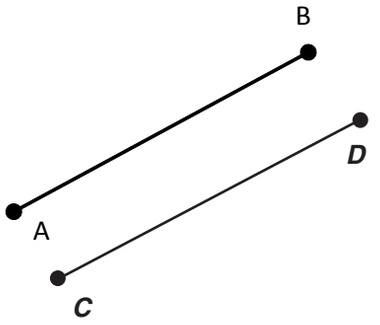
Step 5: Draw a line through points D and F. $\overline{DF}$ is parallel to $\overline{AB}$.



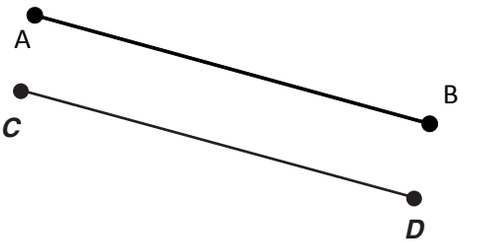
Practice:

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

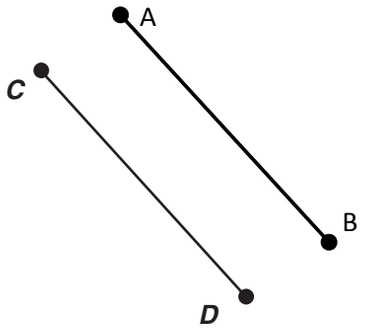
a.



b.



c.



d.

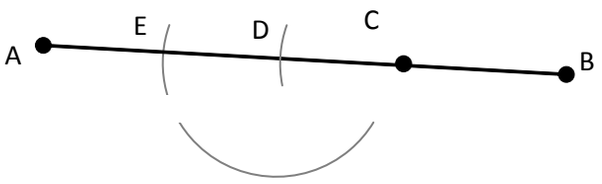
Constructing parallel line segments using a compass

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

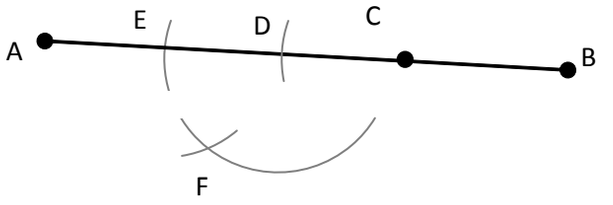
Step 2: Choose a point along $\overline{AB}$ called point C.

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

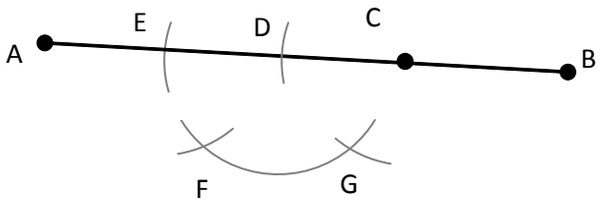
Step 4: Place a compass on point D, draw another arc on $\overline{AB}$ called point E. Draw a second large arc below $\overline{AB}$. (Do not change the angle of the compass.)



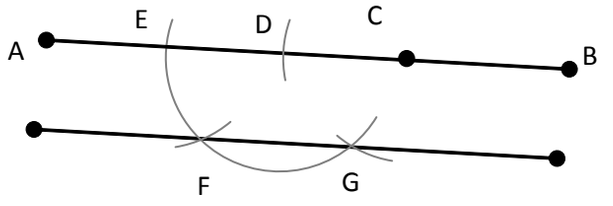
Step 5: Place a compass on Point E, draw an arc below intersecting the large arc, and label this Point F.



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



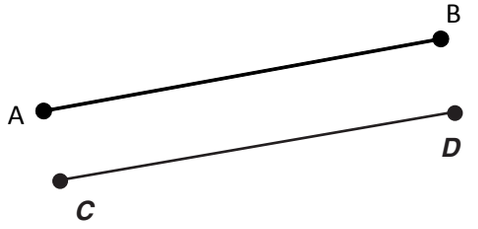
Step 7: Draw a line connecting point F and G. $\overline{FG}$ is parallel to $\overline{AB}$.



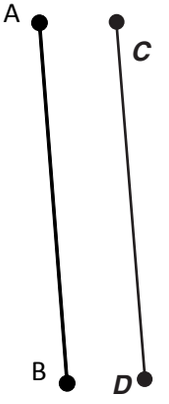
Practice:

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

a.



b.

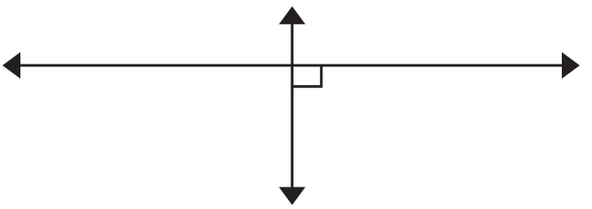


Objective:

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

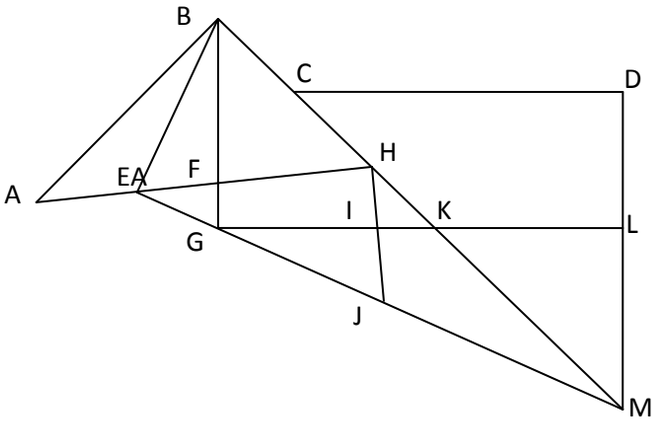
Perpendicular line segments

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



Practice:

Use the diagram to answer the following questions.



a. What is a line segment that is perpendicular to $\overline{BM}$?
$\overline{AB}$

b. What is a line segment that is perpendicular to $\overline{AH}$?
$\overline{HJ}$

c. What is a line segment that is perpendicular to $\overline{BG}$?
$\overline{GL}$, $\overline{CD}$, $\overline{GI}$ or $\overline{GK}$

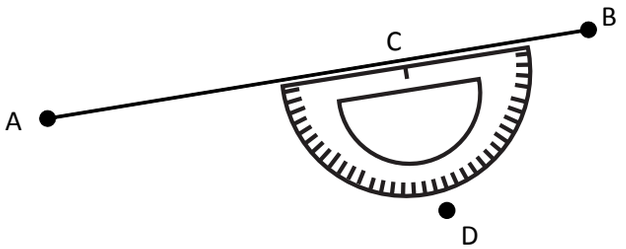
d. What is a line segment that is perpendicular to $\overline{CD}$?
$\overline{DM}$ or $\overline{BG}$

Constructing perpendicular line segments using a protractor

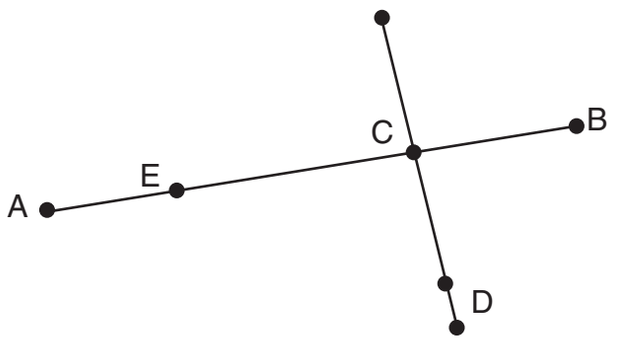
Step 1: Draw any line segment called AB ($\overline{AB}$).

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

Step 3: Use a protractor to mark a point D, 90° from point C.



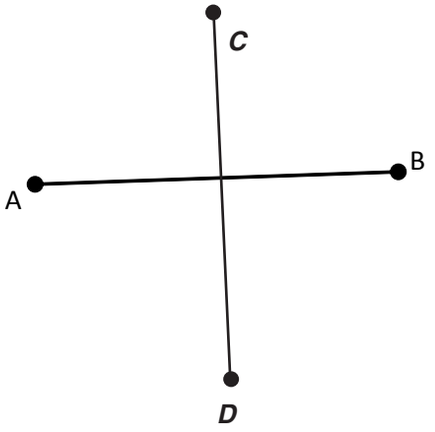
Step 4: Draw a line that passes through point C and D.
$\overline{CD}$ is perpendicular to $\overline{AB}$.



Practice:

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

a.



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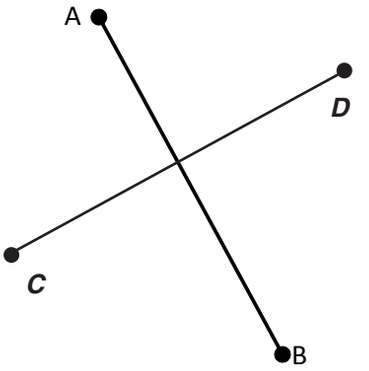
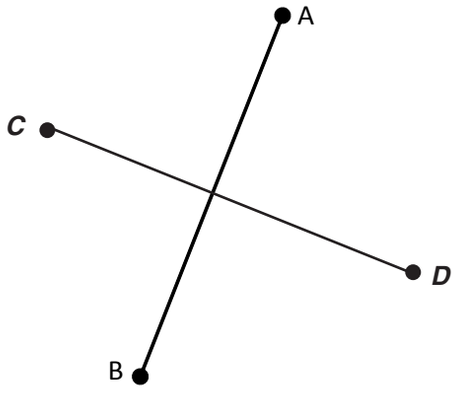
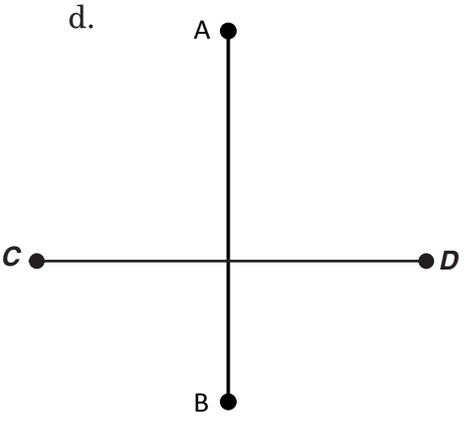


c.



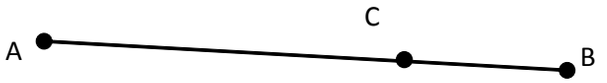
d.



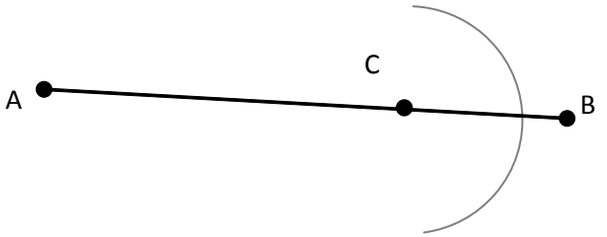
Constructing perpendicular line segments using a compass

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

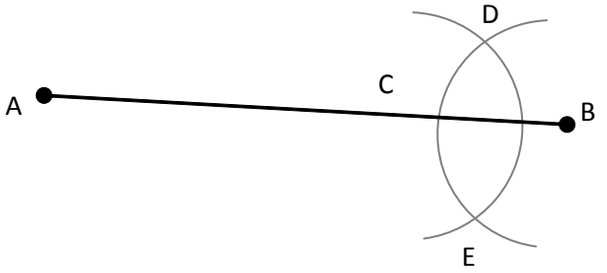
Step 2: Choose a point along $\overline{AB}$ called point C.



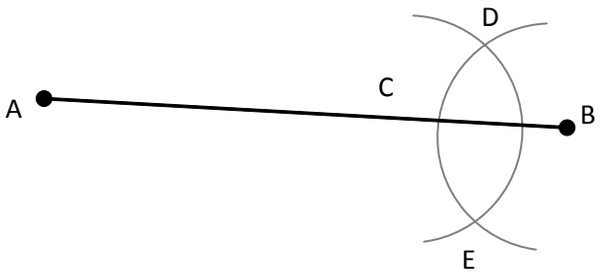
Step 3: Place a compass on point C, draw a large arc on $\overline{AB}$.



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.



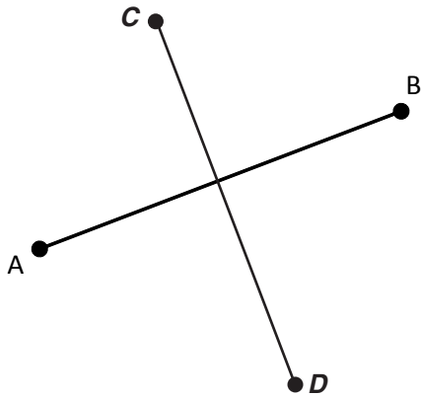
Step 5: Draw a line through points D and E. $\overline{DE}$ is parallel to $\overline{AB}$.



Practice:

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

a.



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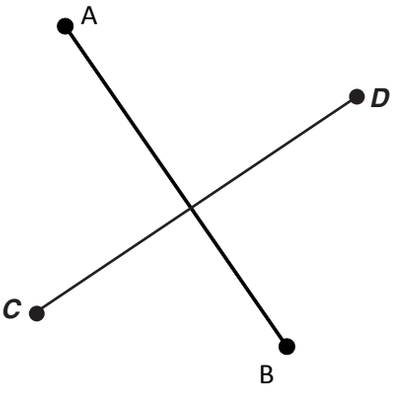
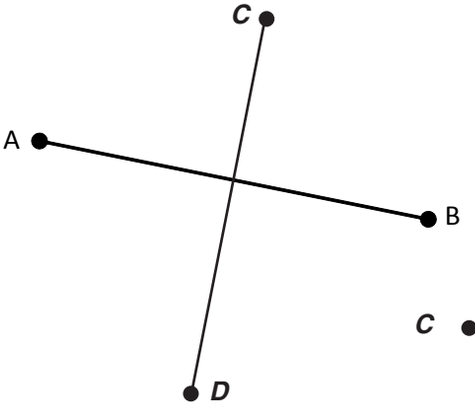
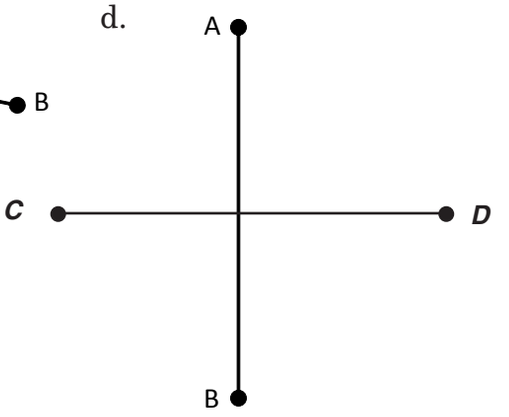


c.



d.

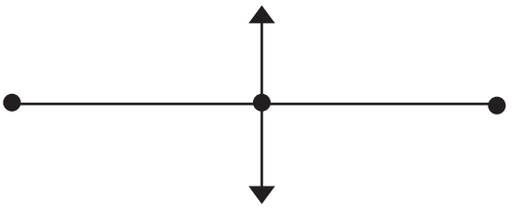


Objective:

- *I can construct perpendicular and angle bisectors.*

Perpendicular bisectors

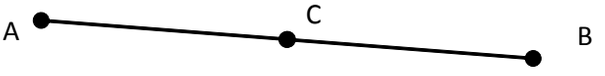
When a line segment is divided into two equal parts it has been bisected. A **Perpendicular Bisector** is a perpendicular line that crossed that middle point..



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.

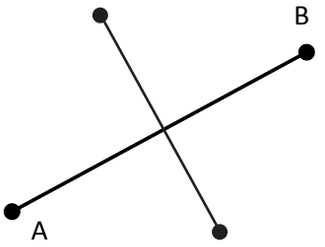


Step 3: Construct a perpendicular line from point C using either a protractor or a compass.

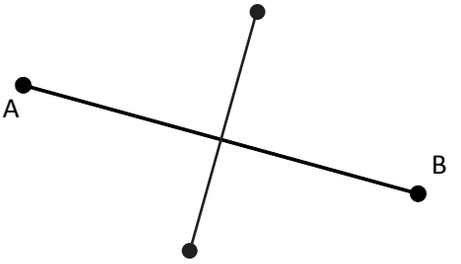
Practice:

Construct a perpendicular bisector. Show your work

a.



b.



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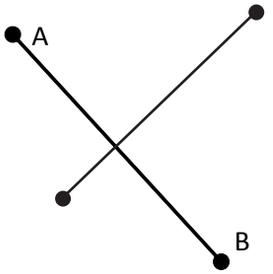
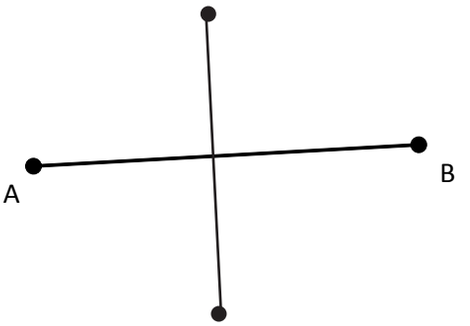
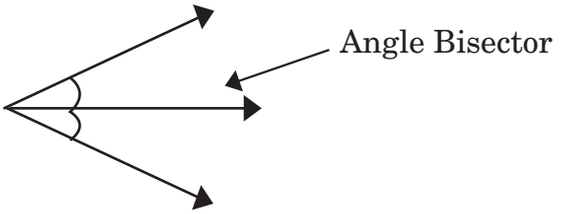


d.



Angle bisectors

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

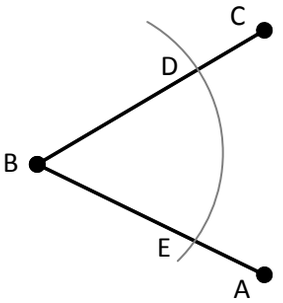


Practice:

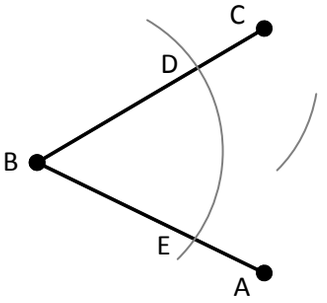
1. If an angle measured 60°, the bisected angles would measure ***30*** °
2. If an angle measured 90°, the bisected angles would measure ***45*** °
3. If an angle measured 52°, the bisected angles would measure ***26*** °

Constructing an angle bisector

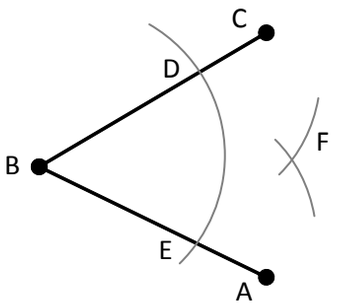
Step 1: Place the compass on the vertex of angle ABC ($\angle$ABC) and draw a large arc intersecting both arms of the angle, points D and E.



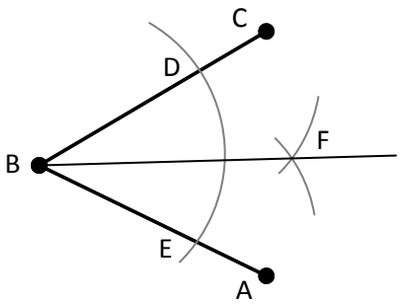
Step 2: Place the compass on point D. Draw an arc near the middle of the angle. Do not change the distance of the compass for the next step.



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



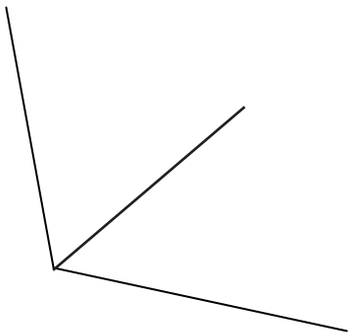
Step 4: Draw a line from B to F to finish the angle bisector.



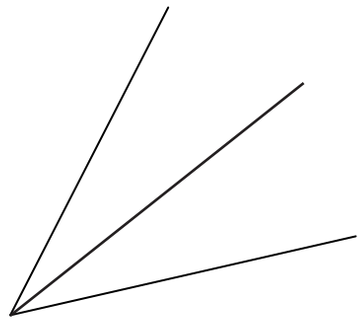
Practice:

Construct an angle bisector. Show your work.

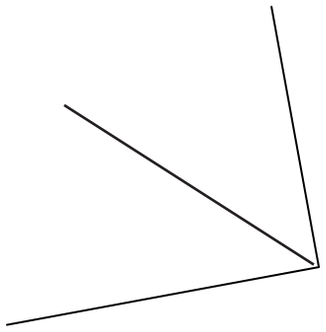
a.



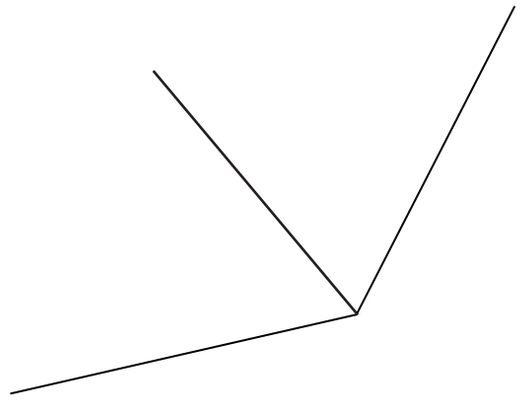
b.



c.



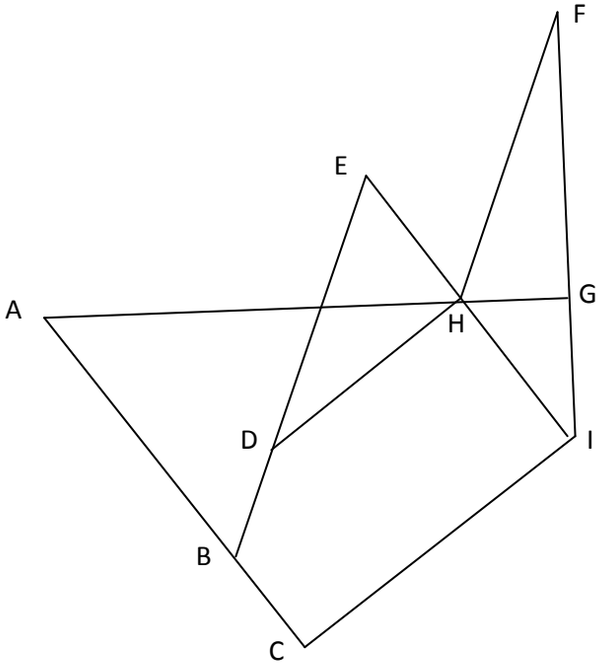
d.



Summary and Practice:

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

1. Use the diagram to answer the following questions.



a. What is a line segment that is parallel to $\overline{AC}$?

$\overline{EI}$

b. What is a line segment that is perpendicular to $\overline{DH}$?

$\overline{EI}$ or $\overline{AC}$ or segments of them.

c. What is a line segment that is parallel to $\overline{BE}$?

$\overline{FH}$

d. What is a line segment that is perpendicular to $\overline{AC}$?

$\overline{CI}$, or $\overline{DH}$

e. Are any segments are not parallel to any other line segments?

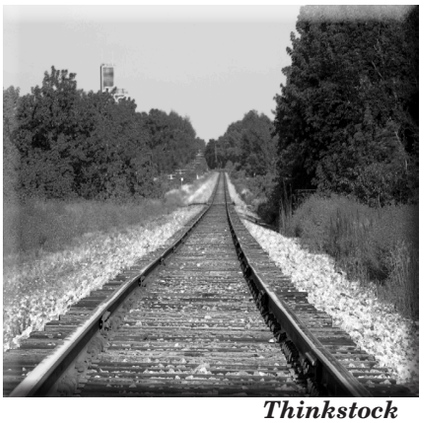
$\overline{AG}$ or $\overline{FI}$

f. What is the relationship between $\overline{AG}$ and $\overline{FI}$?

The lines are perpendicular

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

   Yes, the edges of the track never meet and are always the same distance apart.



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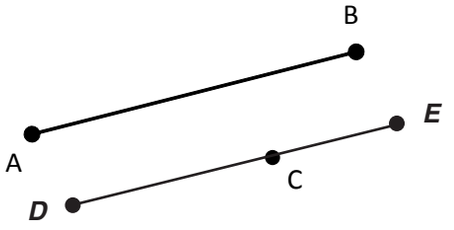
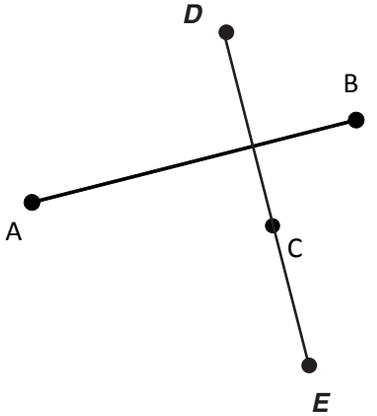
3. What is the easiest way to check if two lines are perpendicular?

   Look for a right angle between the two lines.

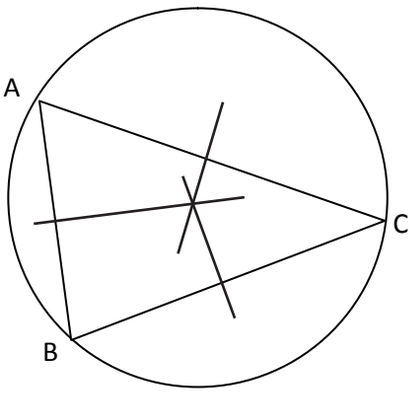
4. Draw a line segment passing through point C that is parallel to $\overline{AB}$. Show your work



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



6. Consider triangle ABC.

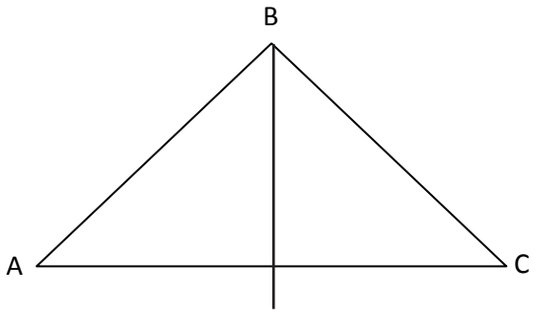


Draw the perpendicular bisectors of each side of the triangle. Show your work.

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

The lines intersect in the middle of the circle. You can check by putting a compass on the point and draw a circle.

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?
They are the same.

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

No, the lines are not the same.

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

An equilateral triangle would have all the angular bisectors the same as the perpendicular bisectors.

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