

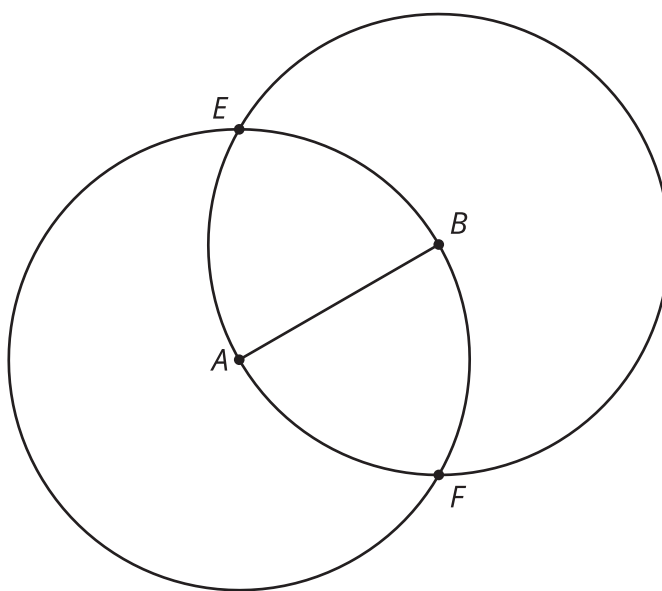


Construction Techniques 3: Perpendicular Lines and Angle Bisectors

Let's use tools to solve some construction challenges.

5.1 Two Circles

Points A and B are each at the centers of circles of radius AB .



1. Compare the distance EA to the distance EB . Be prepared to explain your reasoning.
2. Compare the distance FA to the distance FB . Be prepared to explain your reasoning.
3. Draw line EF , and write a conjecture about its relationship with segment AB .

5.2 Make It Right

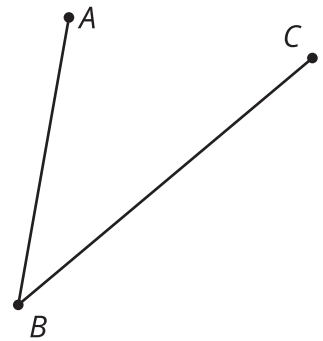
Here is a line ℓ with a point labeled C . Use straightedge and compass moves to construct a line perpendicular to ℓ that goes through C .



5.3 Bisect This

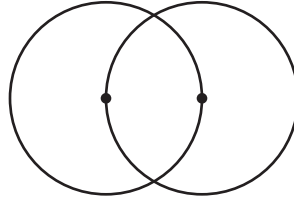
Here is an angle:

1. Estimate the location of a point D so that angle ABD is approximately congruent to angle CBD .
2. Use compass and straightedge moves to create a ray that divides angle CBA into 2 congruent angles. How close is the ray to going through your point D ?

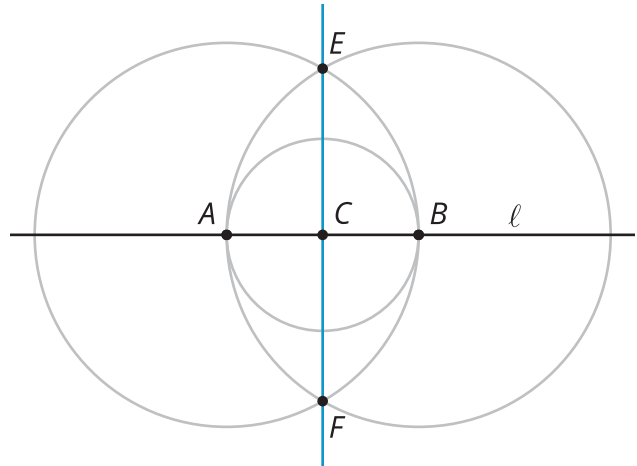


Lesson 5 Summary

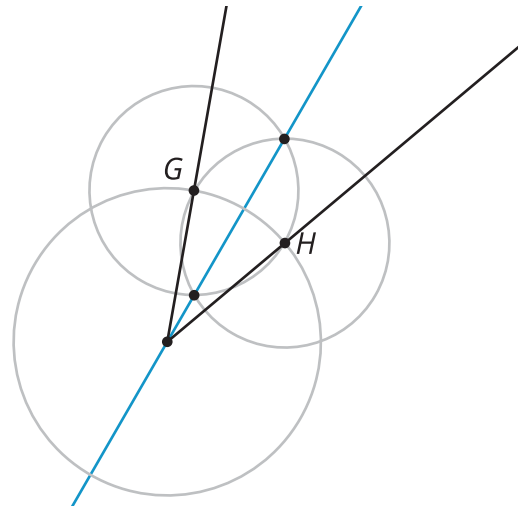
We can construct a line that is perpendicular to a given line. We can also bisect a given angle using only a straightedge and compass. The line that goes through the vertex of an angle to divide it into two equal angles is called the **angle bisector**. Both constructions use 2 circles that go through each other's centers:



To construct a line perpendicular to line ℓ that goes through a given point C , start by finding 2 points, labeled here as A and B , on the given line ℓ that are the same distance from C . Then create 2 circles of the same size centered at A and B that go through each other's centers. Connect the intersection points of those circles to draw a perpendicular line, EF .



To construct an angle bisector, start by finding 2 points, labeled here as G and H , that are on the rays and the same distance from the vertex. Then create the 2 circles of the same size centered at G and H that go through each other's centers. Connect the intersection points of those circles to draw the angle bisector.



In fact, we can think of creating a perpendicular line as bisecting a 180 degree angle!