Construction from Definition (Part 1)

Narrator: Han, Clare, and Andre need to construct an angle bisector.

Han: We can use a circle to construct two points the same distance from point *A*. Let’s label those points *D* and *E*.

Clare: Now we can connect *D* and *E*. Let’s label the midpoint of segment *DE* and call it *F*.

Andre: So now draw ray *AF.* That’s the bisector of angle *DAE*.

Narrator: Now Han, Clare, and Andre need to write a proof that ray *AF* is the angle bisector of angle *DAE*. They each start by sharing some rough draft thinking.

Han: We know *F* is the midpoint of segment *DE*. So segments *DF* and *EF* are the same length. I notice that *F* is also on the perpendicular bisector of angle *DAE*.

Clare: Since segment *DA* is congruent to segment *EA*, triangle *DEA* is isosceles. And *DF* has to be congruent to *EF* because they are the same length. So, *AF* has to be the angle bisector.

Andre: What if you draw a segment from *F* to *A*? Segments *DF* and *EF* are congruent. Also, angle *DAF* is congruent to angle *EAF*. Then both triangles are congruent on either side of the angle bisector line.

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