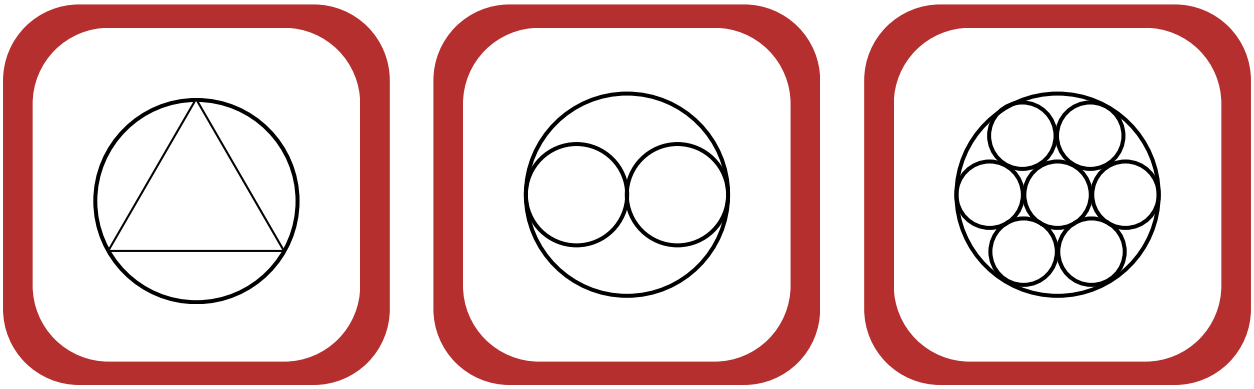
Construction Challenge
ANSWER KEY



You've reached the construction challenge!
We will give you two dots to start with.
BUT! There are some rules of construction you have to follow:

1) Use only your two tools — the compass and the straightedge.
No rulers with numbers, no protractors, no tricks!

2) You may only draw from points you already have.
Every new line or circle must start from something you've made.

3) When lines or arcs cross, mark that spot!
Intersections are your magic clues to the next step.

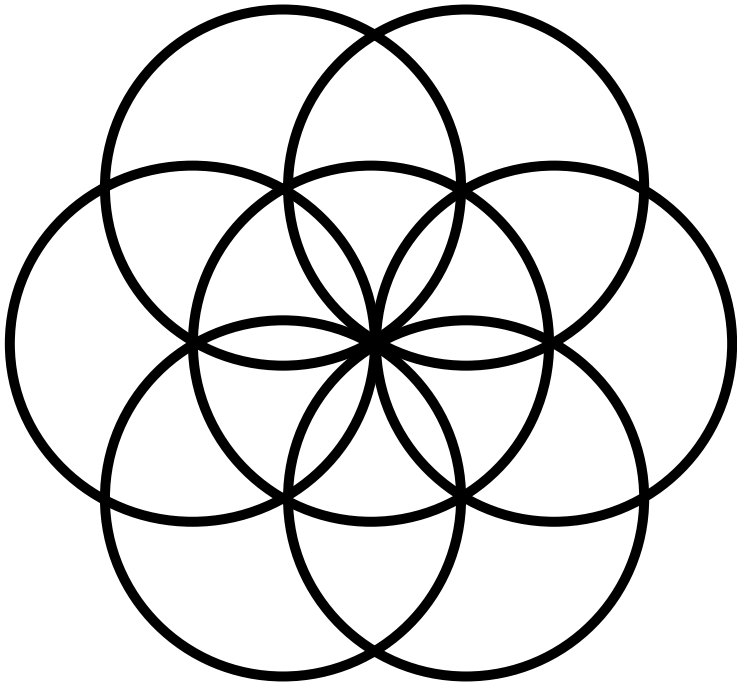
4) Don't measure — copy!
You can keep your compass the same size to copy lengths, but you can't measure precise lengths with your ruler.

5) Have fun! Or else...

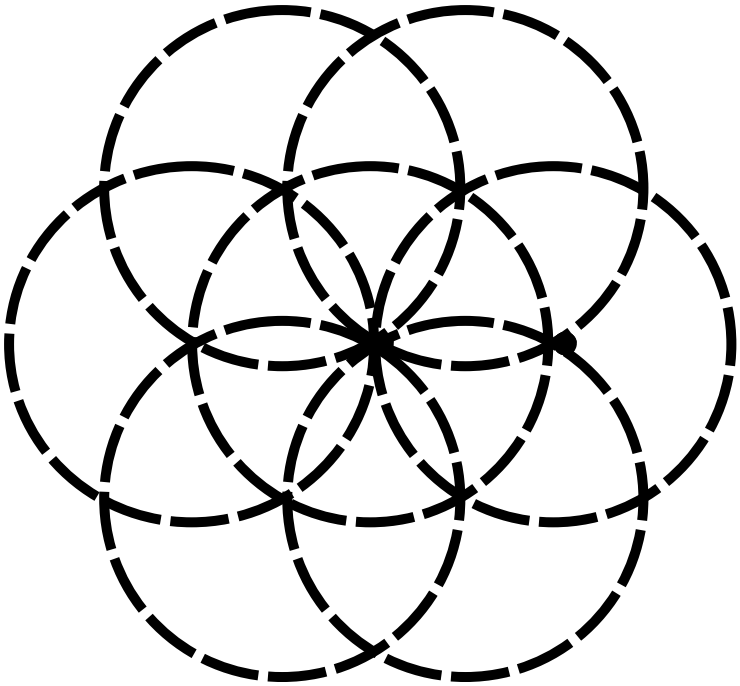
But first! WARM-UPS!

Warm-ups

Who wants to draw some circles - I know you do!
Try make this lotus flower: **(2 pts)**



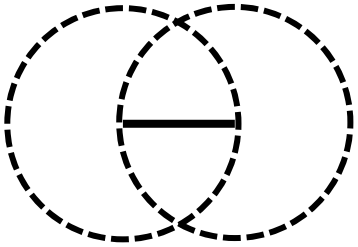
You're only allowed to center circles around intersections!
Here's two starting points:

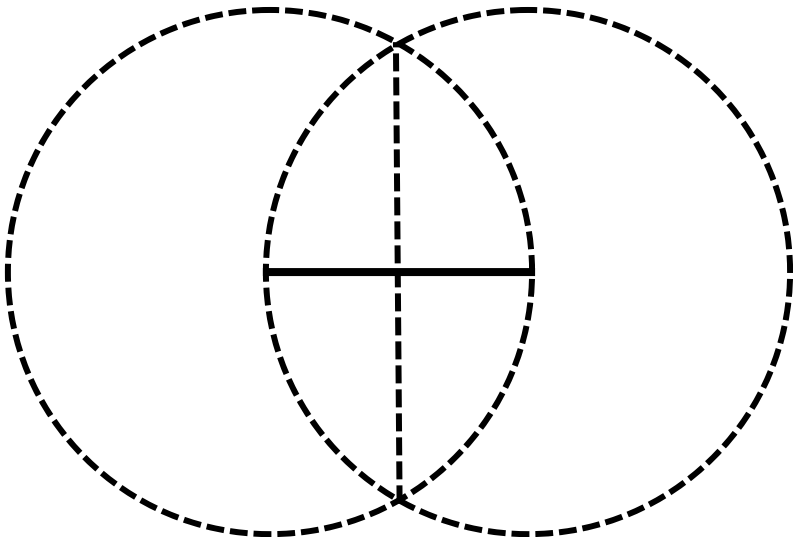


Warm-ups

Anyone know karate? Let's chop this board in half and by that I mean it's line bisection time! Perfectly bisect the line below: **(5 pts)**

Here's a cheeky visual hint...:

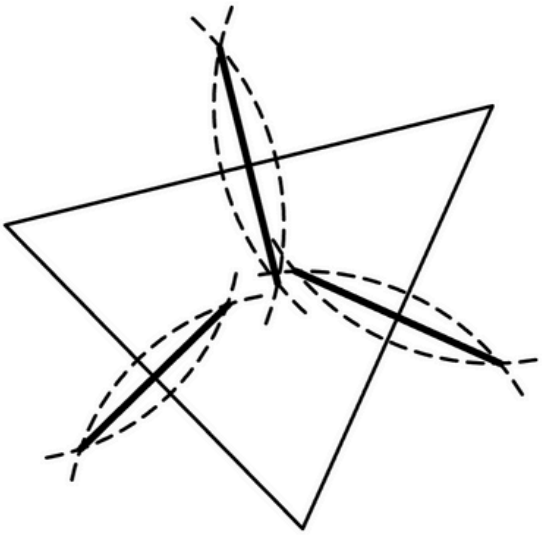




Note: partial circles/circular arcs are fine as long as the bisector is still drawn properly.
(Both circles should be the same radius and there should be a line connecting their intersection points)

Warm-ups

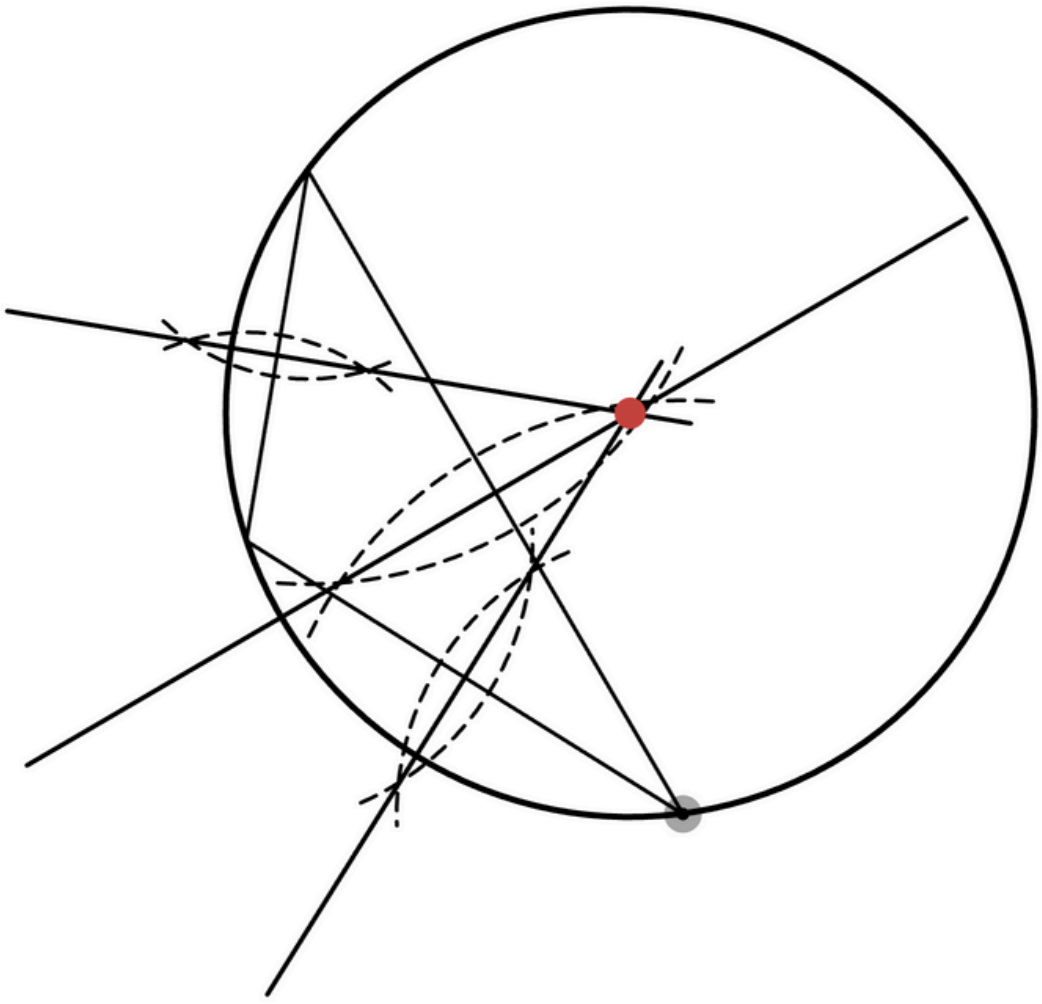
Cut some cheese with your newly acquired perpendicular bisection skills...
And yes. ALL the sides **(8 pts)**



Note: students may have bigger circles, but we used small arcs here for clarity. If a group's page gets too messy, you can give them a new sheet of paper to try on. They are permitted to draw their own triangles on the new paper so long as they resemble the one on the worksheet.

Warm-ups

Fully cut another one... And the lines... Hey, are they meeting at a point? At the center of something? Like a cheese wheel? Don't you want to draw a cheese wheel? **(10 pts)**

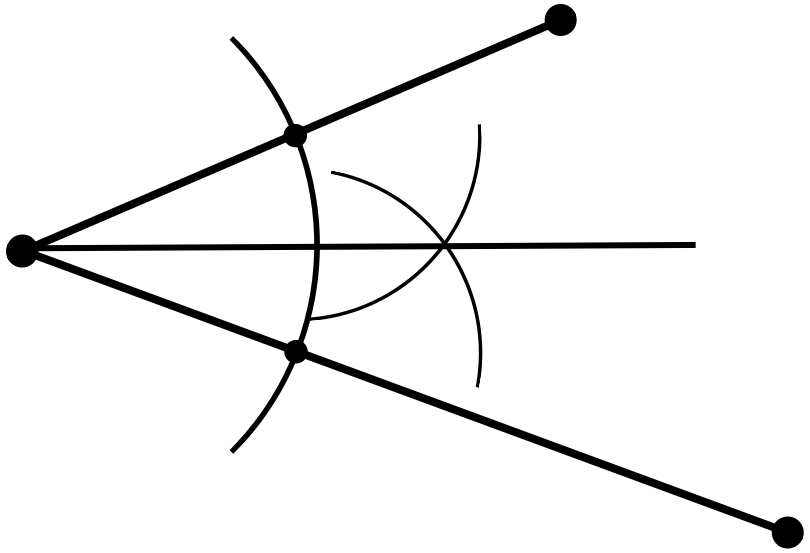


Make sure all three bisectors are drawn, and that they intersect at a point. Also make sure the circle drawn from the point goes through all three vertices of the triangle.

Construction Challenge

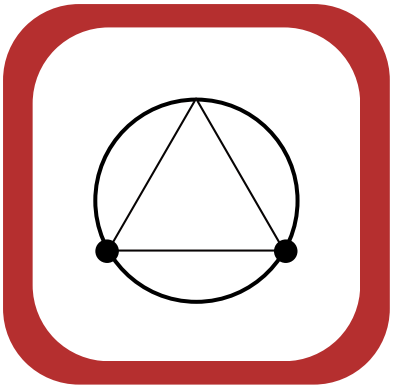
Angle bisection! Angle bisection!
The math wizard left you with a riddle... **(5 pts)**

Start where the two rays meet just right,
Swing arcs on both — a matching sight.
From each new mark, let arcs once play,
Their crossing shows the halfway way.
Draw from the point through where they cross —
Now you're the angle bisecting boss!



Make sure they draw two intersection points on the lines, and then make sure they draw a circle from each of the two intersection points to finish the challenge. Picture should relatively match. It's ok if they draw two arcs at the start instead of one, as long as both are the same radius.

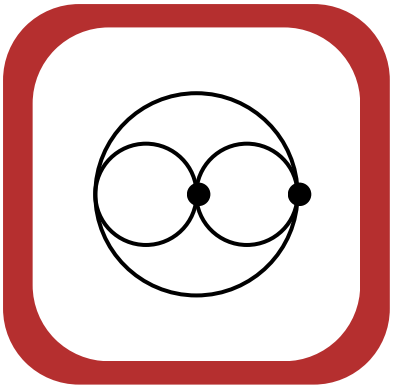
Construction Challenge



(3 pts)

Construction should match picture.

Construction Challenge



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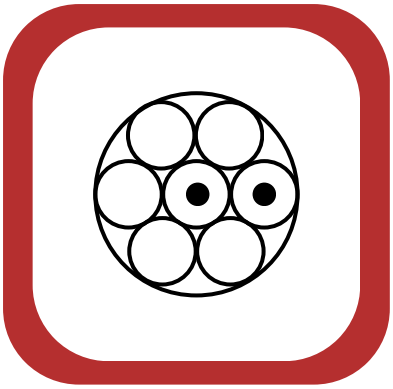
Construction should match picture.

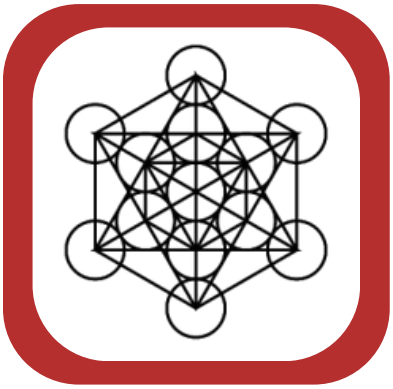
Construction Challenge



(3 pts)

Construction should match picture.

Construction Challenge



Here's Metatron's cube for the ambitious!

It's worth NO points unless you've completed all other constructions!
IF all else completed as well, worth 15 pts.

Construction should match picture.