

Constructing Geometric Figures

Name: _____ Period: _____

Historically, geometry was done by constructing different shapes using basic tools. The two basic tools were a straightedge and a compass (different from the compass that points north). A straightedge could be used to draw a line between any two points and a compass draws a circle centered at any point. Today, we have the benefit of being able to use technology to recreate these tools without relying on pencil and paper. **The questions to answer are in bold.** **You will also need to submit some screenshots on Google Classroom.** You may want to make an account so that your progress is saved.

1. Open up the website euclidea.xyz/game/packs and start the first pack. You're given a line segment with a point on either end.
 - a. Draw a circle with a center at one point and the edge at the other.
 - b. Draw another circle, this time starting at the other point. You should have two equally sized circles. Plot a point where they intersect.
 - c. **What do you notice about those points?**
 - d. Finish constructing the equilateral triangle and progress to the next level.
2. The second level asks us to make a 60° angle. We know a shape with a 60° angle! (Hint: the previous level). **Why do you know the angle you've made is a 60° angle?**
3. A perpendicular bisector is a line that forms right angles with another line and cuts it exactly in half. The construction for a perpendicular bisector will look just like another construction we've made. Make a perpendicular bisector on question 1.2 and **put the screenshot on Google Classroom.**
4. When you get to question 1.5, it wants you to make a rhombus inside a rectangle. To do this, you need to use a property of quadrilaterals. **Which property of a rhombus are you using to make this construction?**
5. After you make a square inscribed in a circle in 1.7, **take a screenshot of your construction, including all parts that were necessary to create it, and submit the screenshot on Google Classroom.**

6. Continue on to the next pack, where you will get a new tool, the angle bisector. After you've made the angle bisector, **how do you know what you've constructed will always bisect the angle? Do you think it might be possible to trisect an angle?** (Split it into 3 equal parts, rather than 2)
7. On question 2.5, you're given a rectangle and asked to draw a line that cuts the area of the rectangle in half. If you're struggling, now might be a good time to use *explore mode*. Click on the symbol in the top right and the item you need to construct will be displayed. If you start drawing items in explore mode, you may realize a property of the construction you didn't already know. (Hint if you're struggling: a line needs two points to be drawn. Can you find a point inside the rectangle that this line will pass through?) Don't forget to exit explore mode before making your construction, then **submit the screenshot on Google Classroom**.
8. Once we have our new perpendicular line tool, we're going to make constructions with *tangent lines*. A tangent line is a line that only touches a circle at a point. (Yes, this is related to $\tan(x)$ from trigonometry.) If a line only touches a circle at one point, **what property does it have that we can use to construct it?**
9. On the final level of pack 2, you're asked to make a circle inside a rhombus. We've got to use properties of a circle and a rhombus to figure out how to construct this shape. Make a circle inscribed inside a rhombus and **submit it to Google Classroom**.
10. From here on out, you're on your own! **Extra credit will be given for each further pack you finish. Submit a screenshot of the last item in each pack for extra credit.** There are a lot of packs, so a lot of opportunities for extra credit here.