



Grade 6 Math Circles

Nov 15/16/17, 2022

Geometric Constructions - Problem Set

Reminder: for each of the following questions, you may only use a compass and a straightedge.

1. Construct a repeating geometric pattern of your choice. (You have the freedom to decide, bonus points if the pattern looks nice, or if you discover a new geometric property)
2. Construct a square.
3. Draw a line ℓ and a point P (not on ℓ).
 - (a) Construct a line passing through P that is perpendicular to ℓ .
 - (b) Construct a line passing through P that is parallel to ℓ .
4. Construct a right triangle and its circumcircle. What do you notice?
5. Construct a circle inscribed in a square.

6. Draw a triangle and construct a circle which passes through the midpoints of each side. This circle is called the nine-point circle. Can you find any other 'interesting' points which lie on this circle?

*The **midpoint** of a line segment is the point on the segment which is halfway between the two endpoints.*

7. Two circles are tangent to each other if they intersect at exactly one point. Draw a point P . Construct 5 circles passing through P which are all tangent to each other.

Hint: Draw a circle with center O and radius OP . Let X be a point on \overline{OP} . Draw a circle with center X and radius XP . What do you notice?

8. Draw a line segment \overline{AB} . Trisect the line segment \overline{AB} (separate it into three equal parts).

Note: [Geogebra](#) is a great online resource for geometric constructions. There are also geometric construction games for those interested (e.g. [Euclidea](#)).