Geometry Journal: Constructions
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NAME:_____

P.I. G.G.17: Construct a bisector of a given angle, using a straightedge and compass, and justify the construction

P.I. G.G.18: Construct the perpendicular bisector of a given segment, using a straightedge and compass, and justify the construction

P.I. G.G.19: Construct lines parallel (or perpendicular) to a given line through a given point, using a straightedge and compass, and justify the construction

1. Describe a situation in which you might want to construct an angle congruent to a given angle.

2. Describe another way to draw a line segment congruent to a given segment that does not involve measuring.

3. Given ΔABC, describe one possible way to construct another triangle similar to ΔABC.

4. Draw $\overline{AB}$. Explain how to construct a square with sides of length AB.

5. Describe how to construct a $15°$ angle.

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6. What technique would you use to find the middle of a sheet of paper so you could divide it in half?

7. Which method do you prefer for determining the perpendicular bisector of a segment: paper folding, or construction with compass and straightedge?

8. The edge of a garden lies along $\overline{AB}$. A gardener wants to divide $\overline{AB}$ into five equal parts in order to create five flower beds equal in size. How can you use the constructions of parallel and perpendicular lines to divide $\overline{AB}$ into five congruent parts?

9. Explain how to construct a line segment with length $\sqrt{5}$ using parallel and perpendicular lines.

10. If you have two perpendicular lines in space, can you construct a third line that is perpendicular to the first two lines? Explain.

11. Given the lines $x + y = 4$ and $y = x + 4,$ how would you construct a circle that is tangent to both?

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[1] Answers may vary. Sample: building a deck and needing right angles

[2] Answers may vary. Sample: You could trace the segment.

[3] Answers may vary. Sample: Construct a triangle in which each side is some multiple of the corresponding side of the given triangle. Another way is to construct another triangle by copying the angles.

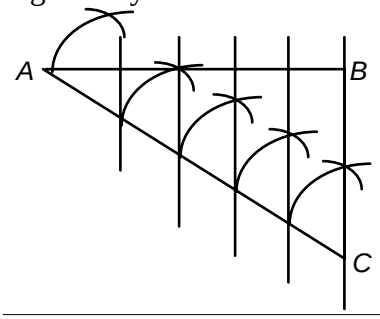
[4] Construct lines perpendicular to $\overline{AB}$ at A and B. Then construct segments congruent to $\overline{AB}$ on those perpendiculars. Finally, connect the endpoints of those segments.

[5] Answers may vary. Sample: Use three equal segments to construct an equilateral triangle, and hence a $60°$ angle. Bisect it and then bisect one of the halves.

[6] Answers may vary. Sample: Folding the paper would be the quickest way.

[7] Answers may vary.

[8] Draw $\overleftrightarrow{AC}$ such that C is not on $\overline{AB}$. Mark off five equal segments along $\overline{AC}$. At the end of the last, draw a line that intersects $\overline{AB}$. Then construct parallels to that line at the end of each of the equal segments you marked off.



[9] Begin with a segment 1 unit long. Construct a perpendicular at one end and a line segment 2 units long on that perpendicular. Draw the hypotenuse, which is $\sqrt{5}$.

[10] Yes; for example, the x- and y-axes are perpendicular. In space, the z-axis is perpendicular to both of them.

[11] Graph the lines and construct the angle bisector of any of the angles formed by their intersection. Choose a point on that line and construct a perpendicular to either given line. Use that distance as the radius of the circle.