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For exercises 1-12, identify the statement as true or false.

1. In a geometric construction, you use a protractor and a ruler.
2. The medians of a triangle are always the same length.
3. If a point is equidistant from the endpoints of a segment, then it must be the midpoint of the segment.
4. The incenter of a triangle is the point of intersection of the three angle bisectors.
5. The orthocenter of a triangle is the point of intersection of the three altitudes.
6. Every point on an angle bisector in a triangle is equally distant from the sides of the angle.
7. The circumcenter of a triangle is the center of the circle inscribes in the triangle.
8. The incenter, the centroid, and the orthocenter are always inside the triangle.
9. The Euler line contains the incenter, the circumcenter and the orthocenter of the triangle.
10. In a right triangle, the circumcenter is located at the midpoint of the side opposite the right angle.
11. It is possible to construct an angle of 22.5 degrees using a compass and a straightedge.
12. The shortest distance from a point to a line is the distance measured along the perpendicular from the point to the line.

For exercises 13-20, identify the correct point of concurrency.

13. The _____ of a triangle is equidistant from the three vertices of the triangle.
14. The point of concurrency of the altitudes of a triangle is called the _____.
15. The point of concurrency of the medians of a triangle is called the _____.
16. The _____ of a triangle is also known as the center of gravity of a triangle.
17. The point of concurrency of the angle bisectors of a triangle is called the _____.
18. The _____ of a triangle divides each median into two parts, such that the distance from this point to the vertex is twice the distance from this point to the midpoint of the opposite side.
19. The _____ of a triangle is equidistant from the three sides of the triangle.
20. The Euler line contains the centroid, circumcenter and the _____.

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For exercises 21-22, find the missing lengths.

21. Point M is the centroid of the triangle below.

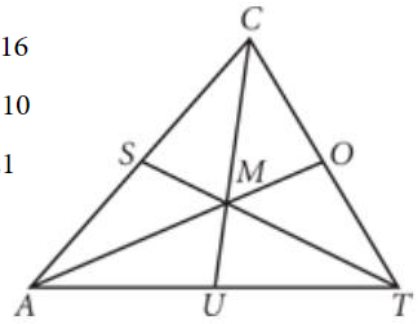
AM = _____ TM = _____

SM = _____ UM = _____

$CM = 16$

$MO = 10$

$TS = 21$



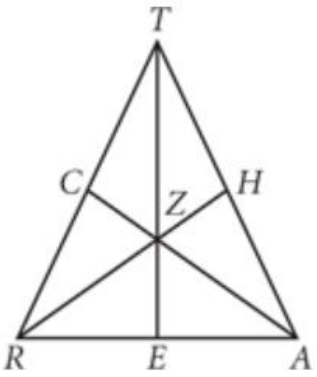
22. Point Z is the centroid of the triangle below.

RH: _____ TE = _____

$CZ = 14$

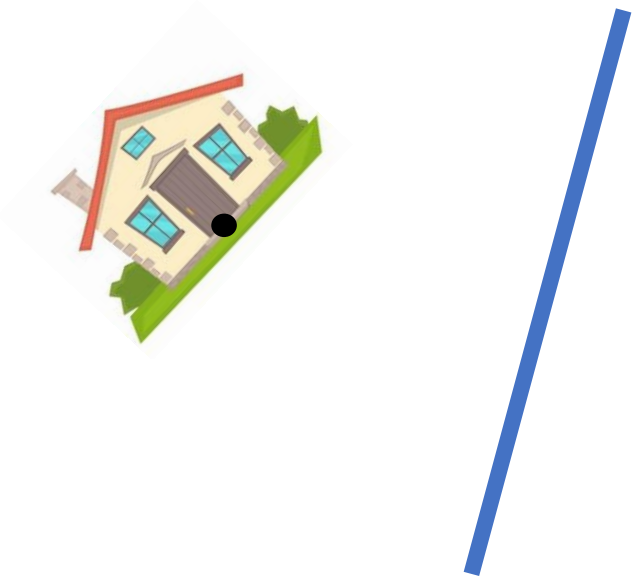
$TZ = 30$

$RZ = AZ$



For exercises 23, use your compass and ruler to construct a path that is the shortest distance from the door (point) to the road.

23.



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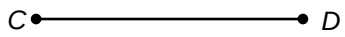
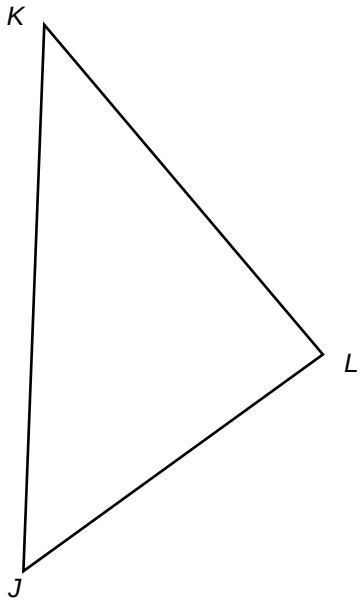
For exercises 24-32, perform the following constructions.

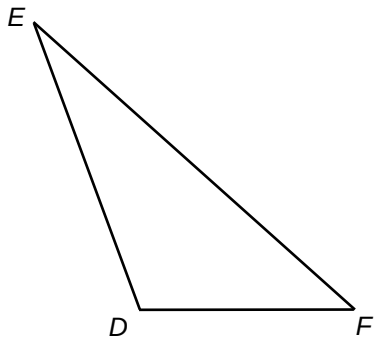
24. Construct an equilateral triangle with side $\overline{CD}$.



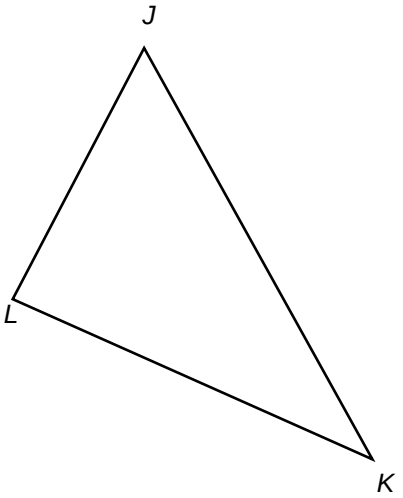
25. Construct the perpendicular bisector of $\overline{LJ}$



26. Construct the altitude $\overline{DA}$ in ΔDEF.



27. Construct the median $\overline{JM}$ in ΔJKL.



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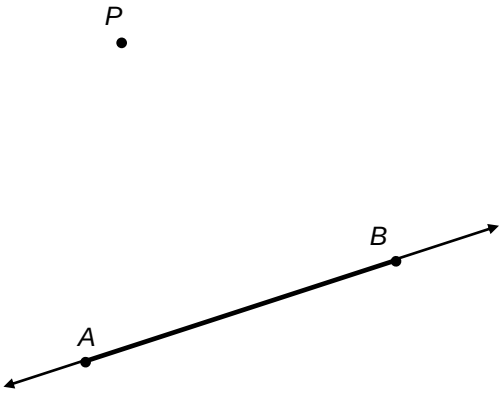
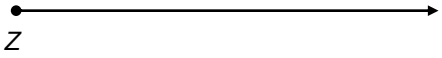
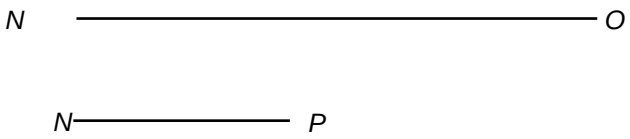
28. Construct a line $\overleftrightarrow{PH}$ parallel to $\overleftrightarrow{AB}$ through point P.

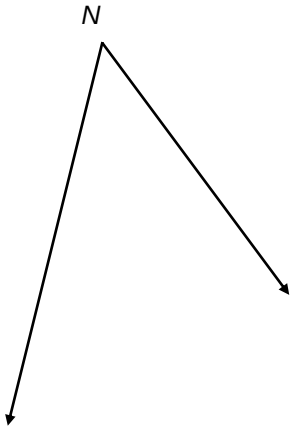


29. Construct an angle of 30° at point Z.



30. Construct and label ΔNOP by duplicating the given segments and angle show below.





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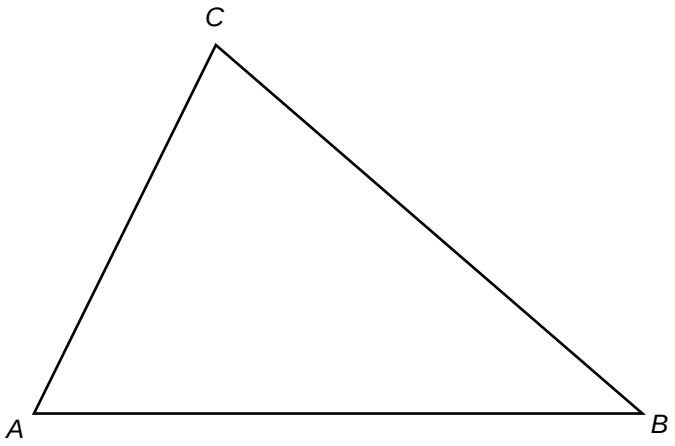
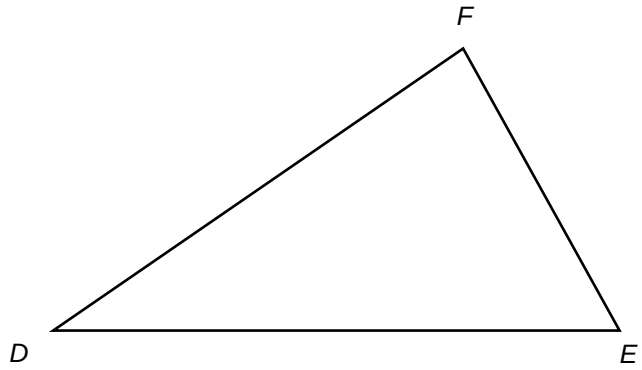
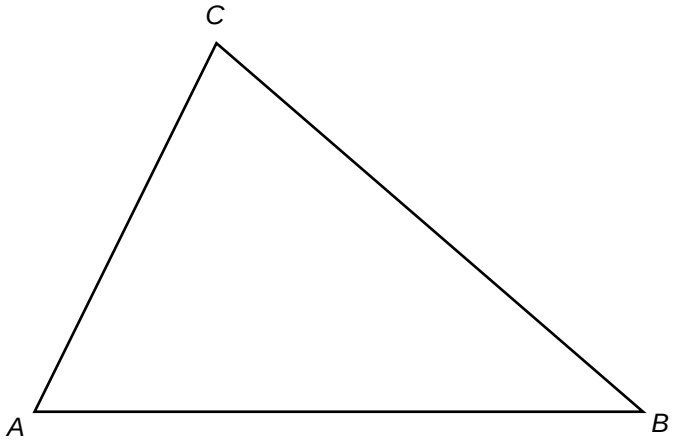
31. Construct the centroid X



32. Construct the orthocenter for ΔDEF.



32. Construct the inscribed circle for ΔABC.



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For the following below, match each geometric construction with one of the figures below.

Construction of a midsegment

Construction of an altitude

Construction of a centroid in a triangle

Construction of an incenter

Construction of an orthocenter in a triangle

Construction of a circumcenter

Construction of an equilateral triangle

Construction of an angle bisector