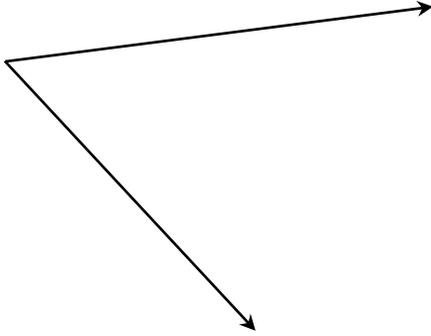


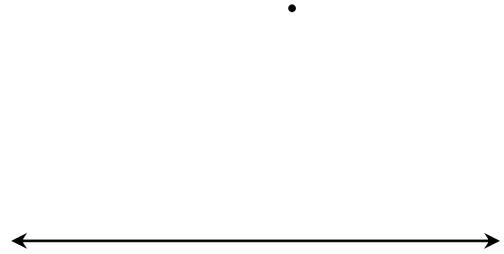
5.3 – Angle Bisectors in a Triangle

Draw the following using a compass and straight edge.

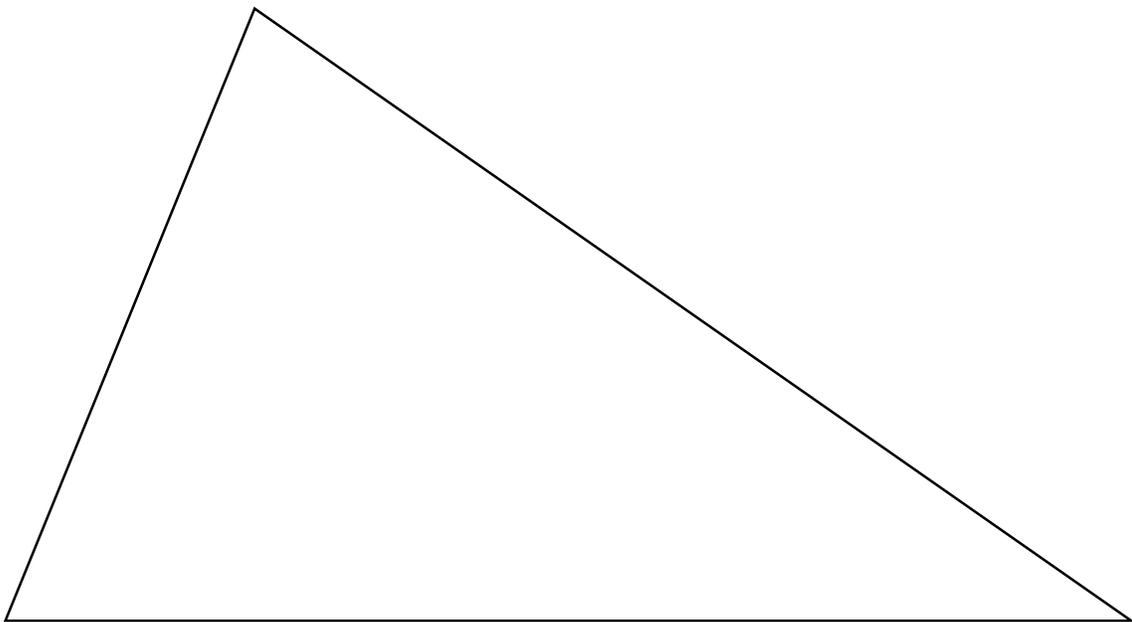
- 1) Bisect the following angle.



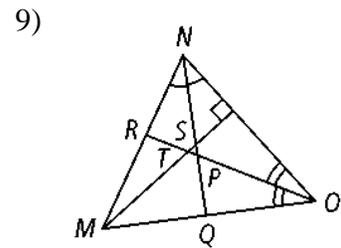
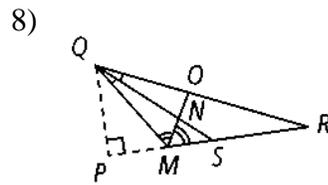
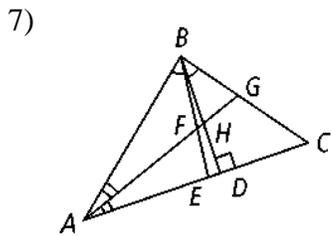
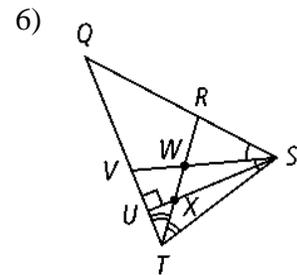
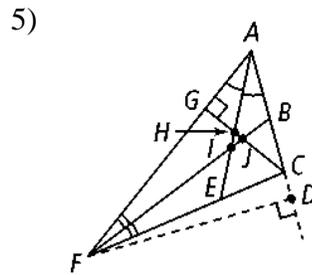
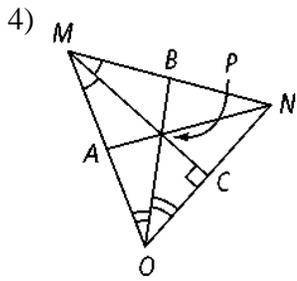
- 2) Draw the perpendicular from the line to the point off the line.



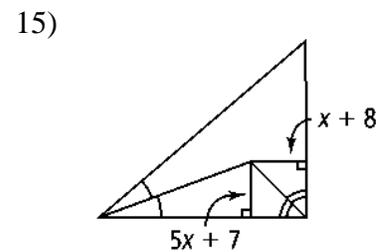
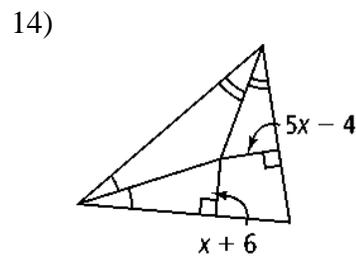
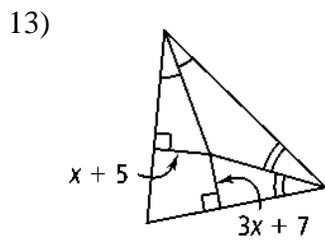
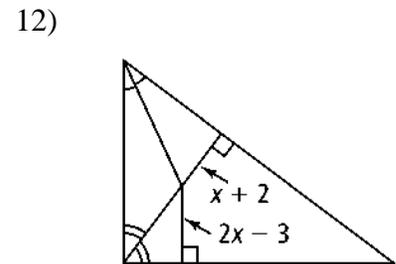
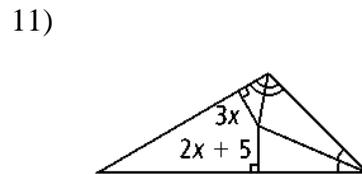
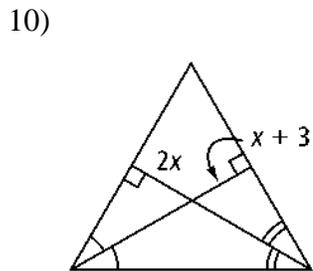
- 3) Draw the inscribed circle in the triangle. Make sure you do the following to accomplish this:
- Draw the incenter
 - Draw a perpendicular from the incenter to one of the sides.
 - Draw the inscribed circle



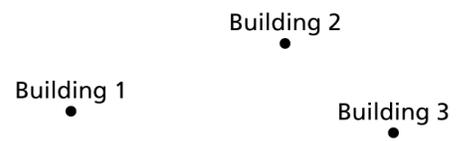
In the following, there are many segments drawn to confuse you. Follow the two angle bisectors given to identify which point is the incenter.



Find value of x . Note: Some of the angle bisectors stop at the incenter and is continued by a perpendicular to a side.



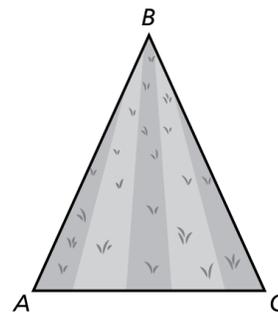
- 15) A cellular phone company is building a tower at an equal distance from three large apartment buildings. Explain how you can use the figure at the right to determine the location of the cell tower.



For each of the following: make a sketch and answer the question:

- 16) Nate Knobbytyre is the dirt-bike officer of Mt. Thermopolis State Park. He wishes to position himself at a point that is the same distance from each of three straight, intersecting (not concurrent) bike paths. Help Nate locate this point so that in an emergency he will be able to get to any one of the paths by the shortest route possible. Which point of concurrency does Nate need to locate?
- 17) Stained-glass artist Sally Solare wishes to inscribe a circle in a triangular portion of her latest abstract design. Which point of concurrency in the triangular section of her design does Sally need to locate?
- 18) Rosita is installing a round sink in her new kitchen countertop. She has marked three points on the countertop to indicate points through which a circle must pass so that she can install the sink. Which point of concurrency of the triangle connecting the three points must she locate to construct the circle?
- 19) Julian Chive is redesigning his kitchen. He wishes to put a butcher block table at a location equally distant from the refrigerator, stove, and sink. The locations of the refrigerator, stove, and sink form what's called a kitchen's work triangle. Which point of concurrency does Julian need to locate?
- 20) Frankie has built a home for her pet hamsters, Brad and Janet. It is in the shape of a triangular prism. She wants to cut out the largest possible circular entrance from one of the bases. Which point of concurrency in the triangular base does Frankie need to locate in order to construct her entrance for Brad and Janet?

- 21) You are using a rotary sprinkler to water the triangular lawn.
- Explain how to locate the sprinkler the same distance from each side of the triangular lawn.
 - Explain how to locate the sprinkler the same distance from each vertex of the triangular lawn.
 - Which is closer to vertex B , the *incenter* or the *circumcenter*? Explain your reasoning.



- 22) Explain when the circumcenter of a triangle lies outside the triangle.