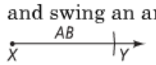
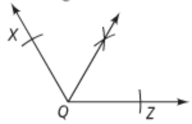
Florida Geometry
Lesson 1B-6 - Practice and Problem-Solving Exercises Solutions

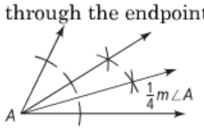
8. Draw $\overrightarrow{XY}$. Place the point of the compass on A and open it to B. Keeping the same setting, place the point of the compass on X and swing an arc that intersects $\overrightarrow{XY}$. Label that intersection Y.



16. Place the point of the compass on Q and swing an arc that interests both sides of the angle. With the point of the compass on one intersection, swing an arc in the interior of the angle. Keeping the same setting, place the point of the compass on the other arc intersection and swing an arc that intersects the arc in the interiors of the angle. Draw a ray whose endpoint is Q through the intersection of the two arcs.



20. Since you need to construct $\frac{1}{4}m\angle A$, you will need to construct two angle bisectors. Place the point of the compass on A and swing an arc that interests both sides of the angle. With the point of the compass on one intersection, swing an arc in the interior of the angle. Keeping the same setting, place the point of the compass on the other arc intersection and swing an arc that intersects the arc in the interiors of the angle. Draw a ray through the endpoint A and the intersection of the arcs.
Place the point of the compass on A and swing an arc that interests both sides of the smaller, bisected angle. With the point of the compass on one intersection, swing an arc in the interior of the angle. Keeping the same setting, place the point of the compass on the other arc intersection and swing an arc that intersects the arc in the interiors of the angle. Draw a ray through the endpoint A and the intersection of the arcs.



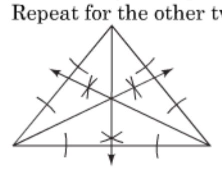
21a. A segment has exactly one midpoint; using the Ruler Postulate (Postulate 1-5), each point corresponds with exactly one number, and exactly one number represents the length of a segment.

21b. A segment has infinitely many bisectors because many lines can be drawn through the midpoint.

21c. In the plane with the segment, there is one perpendicular bisector because only one line in that plane forms a right angle with the given line at the midpoint.

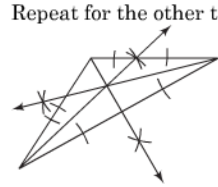
21d. Consider the plane that is the perpendicular bisector of the segment. Any line in the plane that contains the midpoint of the segment is a perpendicular bisector of the segment, and there are infinitely many such lines.

26a. Place the point of the compass on a vertex of the triangle and swing an arc that interests both sides of that angle. With the point of the compass on one intersection, swing an arc in the interior of the angle. Keeping the same setting, place the point of the compass on the other arc intersection and swing an arc that intersects the arc in the interiors of the angle. Draw a ray through the vertex and the intersection of the arcs, making sure that the ray is long enough to intersect the opposing side.
Repeat for the other two vertices:



The three angle bisectors meet at a point.

26b. Place the point of the compass on a vertex of the triangle and swing an arc that interests both sides of that angle. With the point of the compass on one intersection, swing an arc in the interior of the angle. Keeping the same setting, place the point of the compass on the other arc intersection and swing an arc that intersects the arc in the interiors of the angle. Draw a ray through the vertex and the intersection of the arcs, making sure that the ray is long enough to intersect the opposing side.
Repeat for the other two vertices:



26c. The angle bisectors of a triangle intersect in one point.

33. D
The only way to construct a midpoint with only a straightedge and a compass is to construct a perpendicular bisector.

34. I
The angle in the diagram can be names using the vertex alone since no other angles share that same vertex. It can also be named using three points: a point on each ray, and the vertex of the angle has to be the second letter in the name. So, $\angle ACB$ is not reasonable.

35. Since M is the midpoint of $\overline{XY}$, $XM = MY$. By substitution, we can solve for x:

$$x^2 - 2 = x$$
$$x^2 - x - 2 = 0$$
$$(x-2)(x+1) = 0$$
$$x = 2 \text{ or } -1$$

But since x is the length of $\overline{XM}$, the negative value makes no sense.

36. Since $\angle DEF$ is the supplement of $\angle DEG$ and $m\angle DEG = 64$,

$$m\angle DEF + m\angle DEG = 180$$
$$m\angle DEF + 64 = 180$$
$$m\angle DEF = 116$$

37. Since $m\angle TUV + m\angle VUW = 100 + 80 = 180$, $\angle TUV$ and $\angle VUW$ are a linear pair by the inverse of the Linear Pair Postulate.

38. The coordinate of A is -7. The coordinate of C is -1. By the Ruler Postulate, $AC = |-7-(-1)| = |-6| = 6$.

42. Since $a = 6$ and $b = -8$, $(a-b)^2 = (6-(-8))^2 = 14^2 = 196$.

43. Since $a = 6$ and $b = -8$, $\sqrt{a^2+b^2} = \sqrt{6^2+(-8)^2} = \sqrt{100} = 10$.

44. Since $a = 6$ and $b = -8$, $\frac{a+b}{2} = \frac{6+(-8)}{2} = -1$.