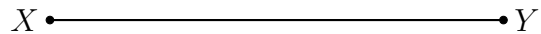**14.2 Classwork: Formal constructions with compass and straight edge**
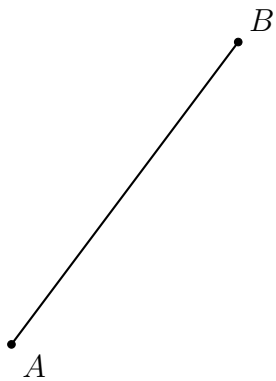
1. Complete the construction of an equilateral triangle with one side as $\overline{XY}$. Show all construction marks, but make no extra lines.

$X \bullet\text{————————————}\bullet Y$

(a) Identify two circles in the construction. For each, name the center of the circle and the radius.

(b) Assuming that the third vertex of the triangle is point $Z$, explain why the distance from $X$ to $Z$ is the same as the distance from $X$ to $Y$.

2. Using a compass and straightedge, construct a line segment $\overline{AC}$ on the ray $\overrightarrow{AB}$ that is twice the length of $\overline{AB}$.

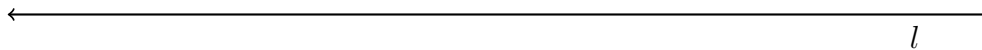$A \bullet\text{————————}\bullet B\text{————————}\longrightarrow$
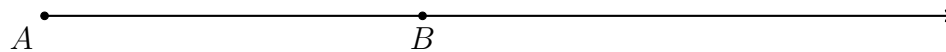
3. Complete the construction of a perpendicular bisector of $\overline{AB}$. Label the midpoint $M$. Show all construction marks, but make no extra lines.
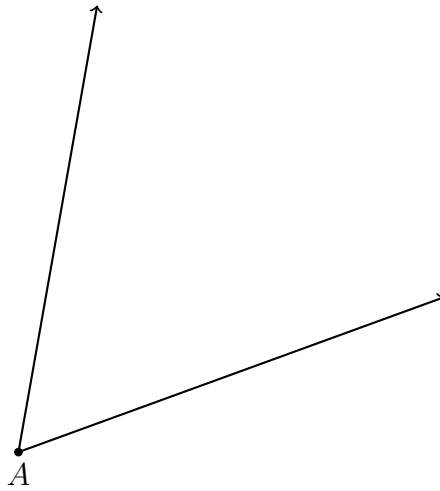
$B$

$A$

4. Complete the construction of a line perpendicular to line $l$ through the point $P$. Show all construction marks, but make no extra lines.
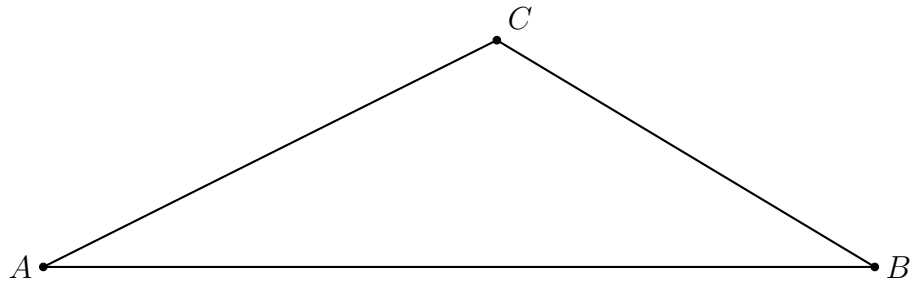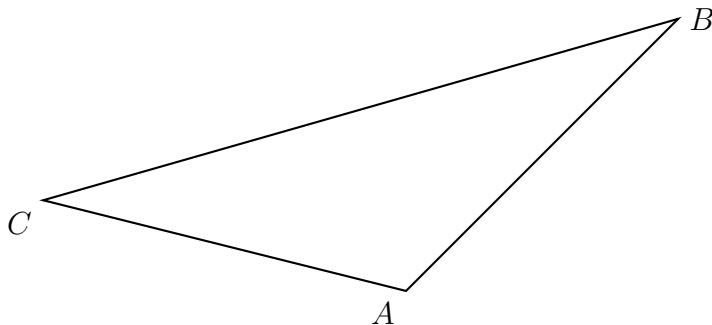
$P$

$l$

5. Bisect the given angle.

$A$

6. Construct a perpendicular to $\overline{AB}$ though $C$.

$C$

$A$                                                                 $B$

7. Using a compass and straightedge, construct $M$, the midpoint of $\overline{AB}$. Then draw the median $\overline{CM}$.



8. Using a compass and straightedge, dilate $\triangle ABC$ by a scale factor of 2 centered at $A$.

Construct line segment $\overline{AB'}$ that is twice the length of $\overline{AB}$ and $\overline{AC'}$ that is twice the length of $\overline{AC}$. Draw $\overline{A'B'}$ to complete the desired triangle, $\triangle AB'C'$.