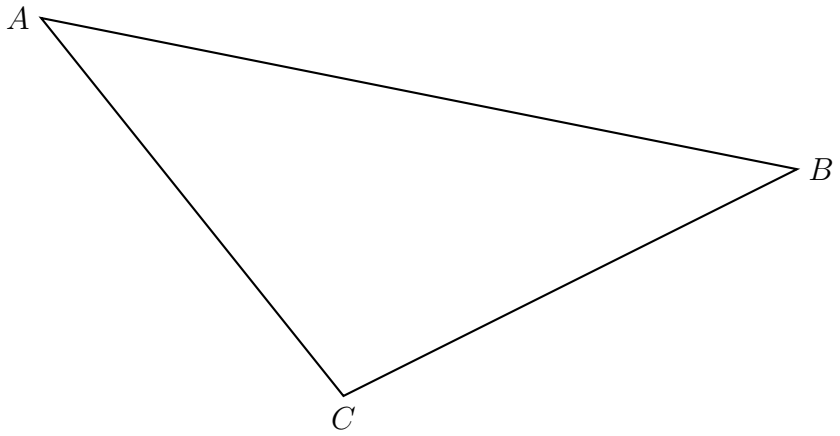
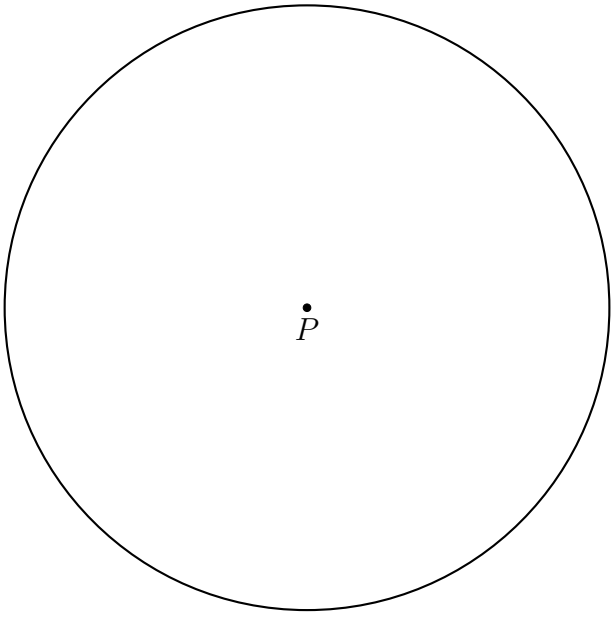
Part 2, Transformational Geometry: Similarity & Congruence

8. Using a compass and straightedge, construct the median to side $\overline{AC}$ in $\triangle ABC$ below. (Leave all construction marks.)



9. With a compass and straightedge, construct a regular hexagon inscribed in circle P. (Leave all construction marks.)



10. $A(-2,-5)$ is one endpoint of $\overline{AB}$. The segment's midpoint is $M(4,-1)$. Find the other endpoint, B.

11. The line l has the equation $y = -\frac{3}{4}x + 3$.

    (a) What is the slope of the line k, given $k \parallel l$?

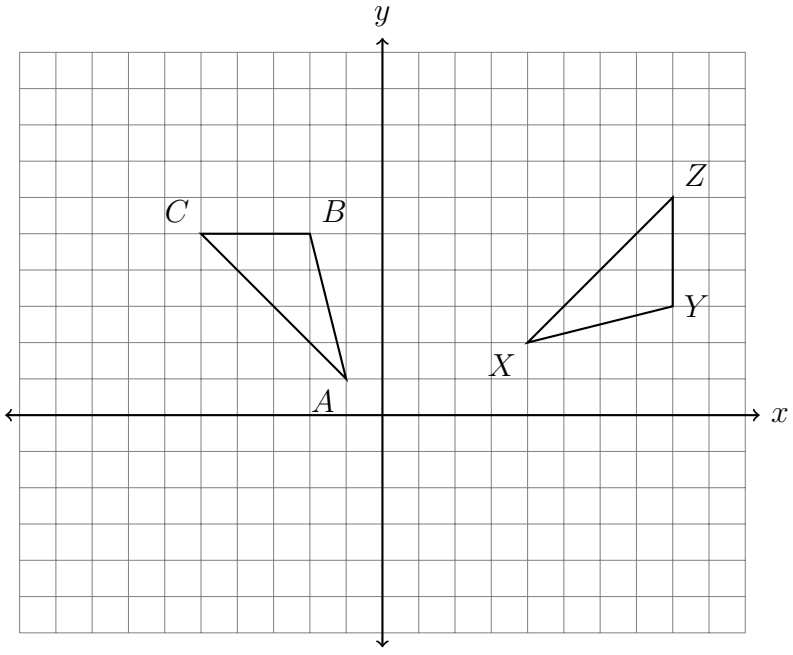
    (b) What is the slope of the line m, given $m \perp l$?

12. Given $P(-3,9)$ and $Q(3,1)$, find the length of $\overline{PQ}$.

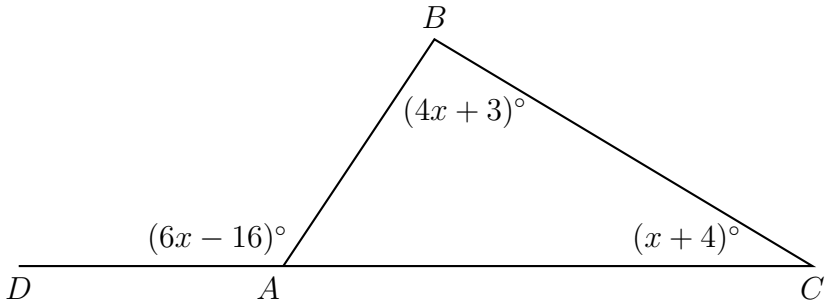
13. A translation maps $D(2,4) \rightarrow D'(-3,4)$. What is the image of $E(5,-5)$ under the same translation?

14. The image of triangle ABC after a rotation is $\triangle A'B'C'$. Is the area of the triangle greater, smaller, or the same after the translation? Justify your answer.

15. The triangle ABC, shown below, undergoes two rigid motions carrying it onto triangle XYZ. State the two isometric transformations. (be specific)

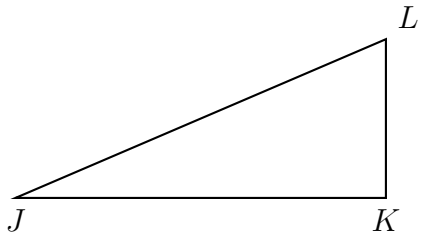


16. In $\triangle ABC$ shown below, side $\overline{AC}$ is extended to point D with $m\angle DAB = (6x - 16)^\circ$, $m\angle C = (x + 4)^\circ$, and $m\angle B = (4x + 3)^\circ$.

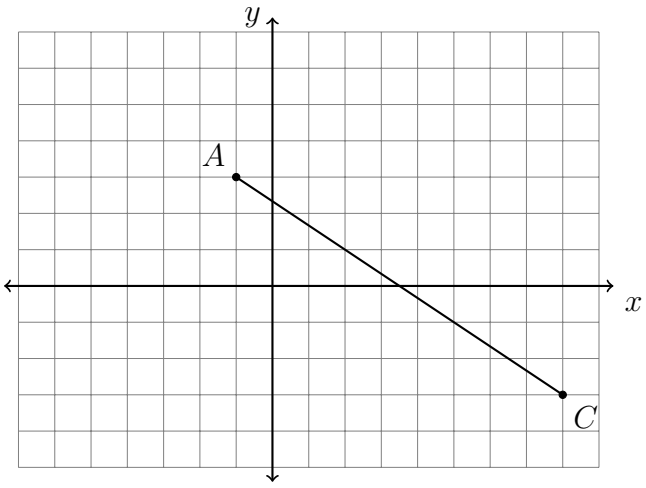


What is $m\angle BAC$?

17. Given right $\triangle JKL$ with $\overline{JK} \perp \overline{KL}$, $JL = 9.7$, $m\angle J = 36°$. Find the length JK, *rounded to the nearest thousandth.*

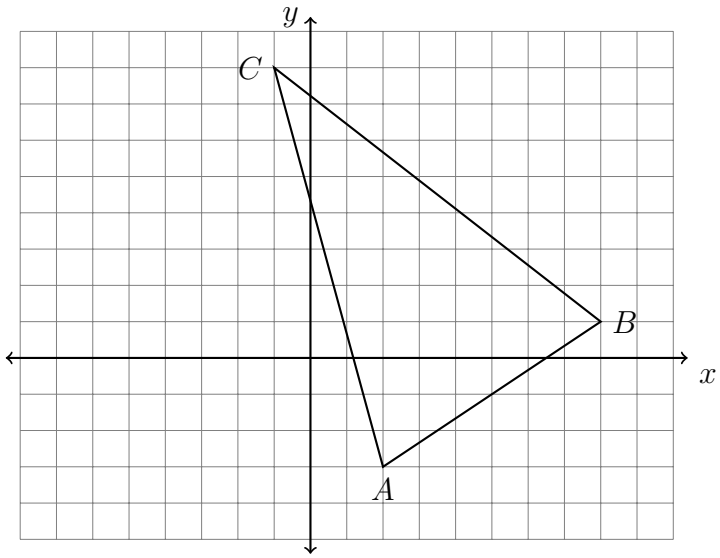


18. In the diagram below, $\overleftrightarrow{AC}$ has endpoints with coordinates $A(-1, 3)$ and $C(8, -3)$.



If B is a point on $\overline{AC}$ and AB:BC = 1:2, what are the coordinates of B?

19. Spicy: Triangle $\triangle ABC$ is graphed on the set of axes below. The vertices of $\triangle ABC$ have the coordinates $A(2, -3)$, $B(8, 1)$, and $C(-1, 8)$.



(a) Draw an altitude through point C perpendicular to $\overline{AB}$.

(b) What is the length of the altitude drawn through C?

(c) What is the length of the base, AB?

(d) Find the area of $\triangle ABC$.