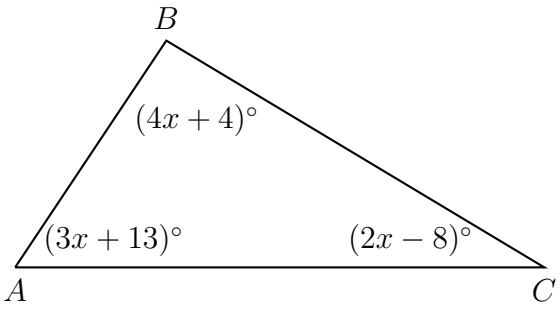
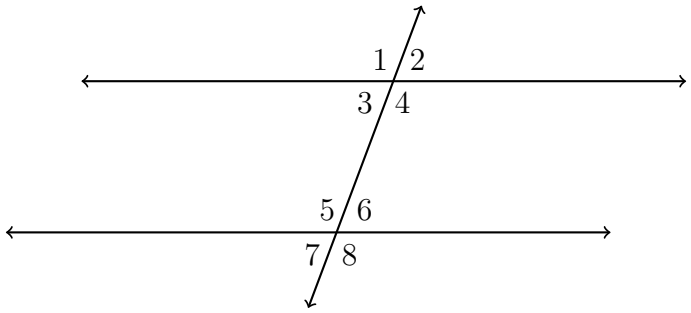
Part 1, Transformational Geometry: Similarity & Congruence

1. In $\triangle ABC$ shown below, $m\angle A = (3x+13)°$, $m\angle B = (4x+4)°$, and $m\angle C = (2x-8)°$. What is $m\angle A$?



2. Given two parallel lines and a transversal, as shown below.

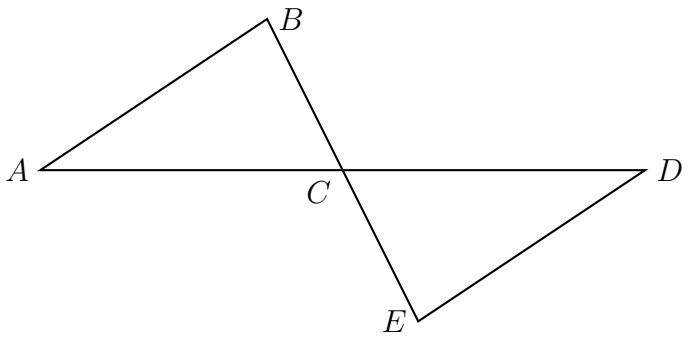


   (a) State the angle corresponding with $\angle 6$.

   (b) Given $m\angle 3 = 73°$ and $m\angle 5 = (3x-1)°$. Find x.

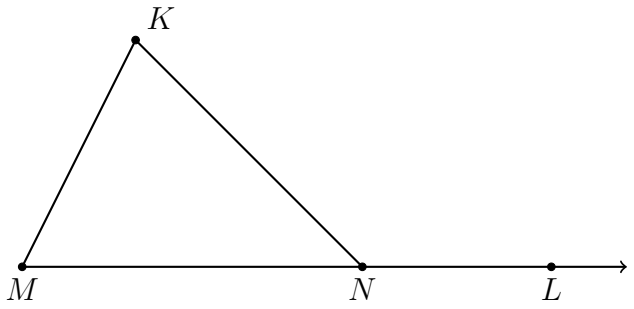
   (c) In a proof, what reason would justify $m\angle 5 + m\angle 6 = 180°$? _____

3. Given $\triangle ABC$ and $\triangle DEC$ with $\angle B \cong \angle E$. C is the midpoint of $\overline{AD}$. Prove $\triangle ABC \cong \triangle DEC$.

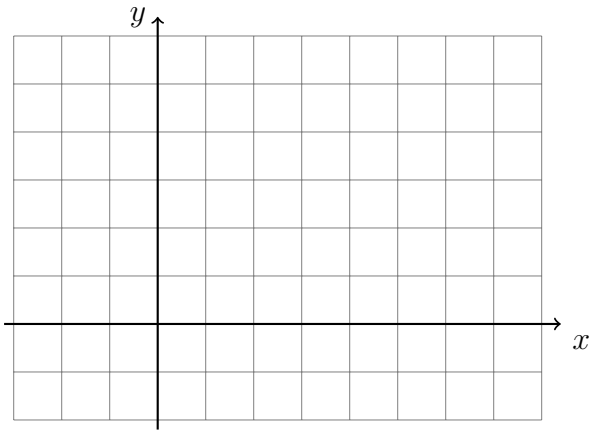


Statement	Reason
1) _____	1) Given
2) _____	2) Given
3) _____	3) Given
4) $\angle BCA \cong \angle ECD$	4) _____
5) _____	5) Definition of a midpoint
6) $\triangle ABC \cong \triangle DEC$	6) _____

4. Given $\overline{KN} \cong \overline{MN}$ and $m\angle KNL = 108°$. Find $m\angle M$.



5. On the graph below, draw $\overline{AB}$, with $A(-1,-1)$ and $B(7,1)$, labeling the end points. Determine and state the coordinates of the midpoint M of $\overline{AB}$ and mark and label it on the graph.



6. Express the result to *the nearest thousandth*.

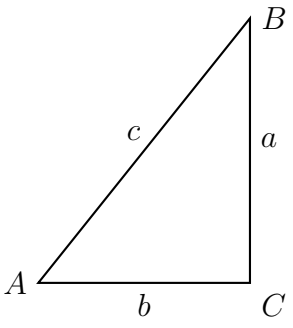
(a) $\sin 42° =$

(b) $\cos 19° =$

(c) $\cos 48° =$

(d) $\sin 71° =$

7. $\triangle ABC$ is shown with $m\angle C = 90°$. The lengths of the triangle's sides are a, b, and c. Express each trigonometric ratio as a fraction of two variables.



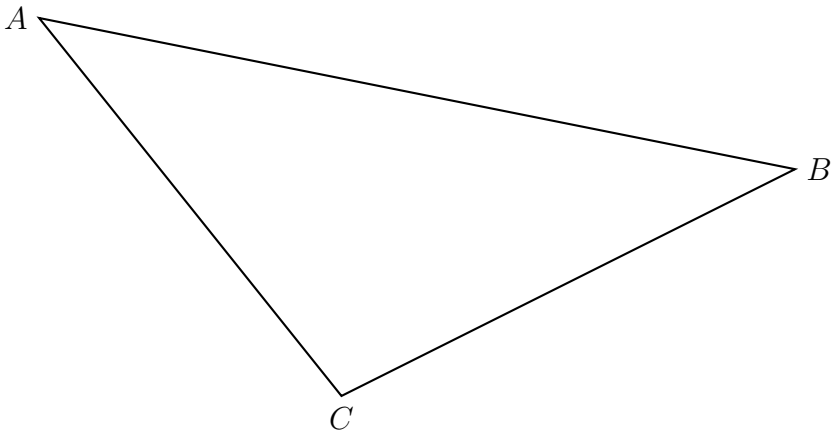
(a) $\sin B =$

(b) $\cos A =$

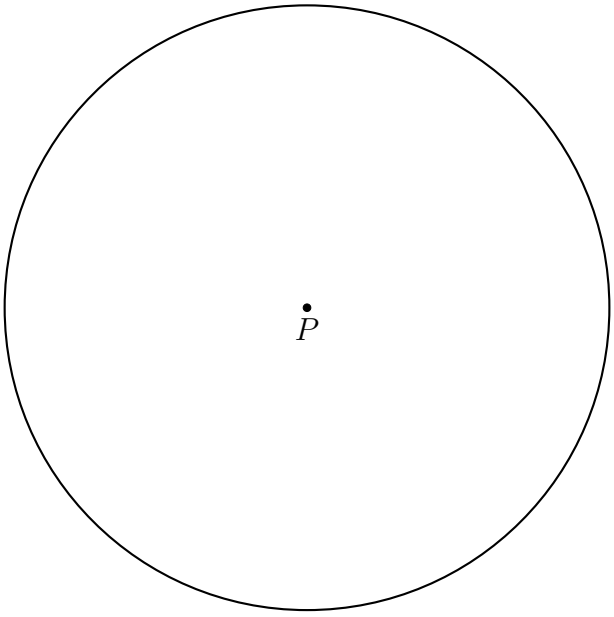
(c) Explain why $\angle A$ and $\angle B$ are complementary.

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 $k \parallel l$?

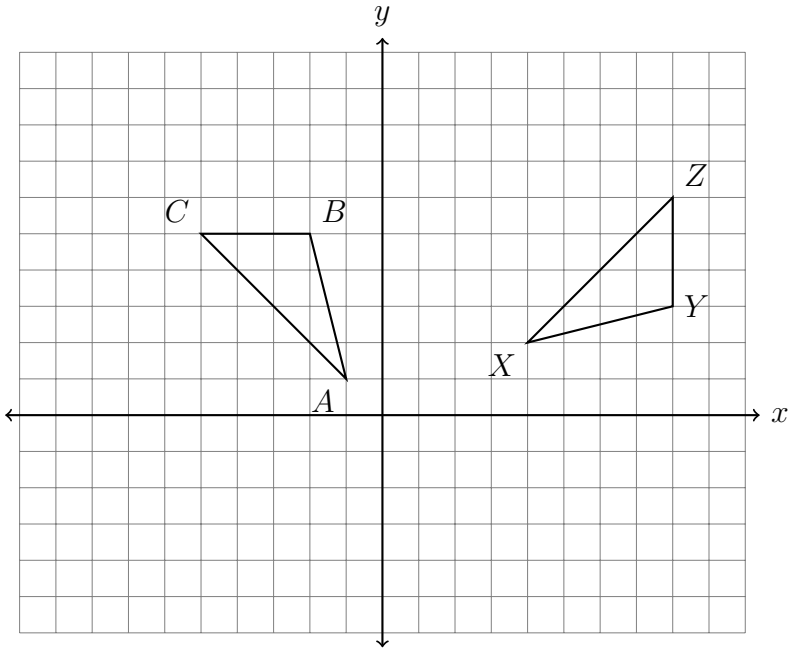
    (b) What is the slope of the line m, given $m \perp l$?

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

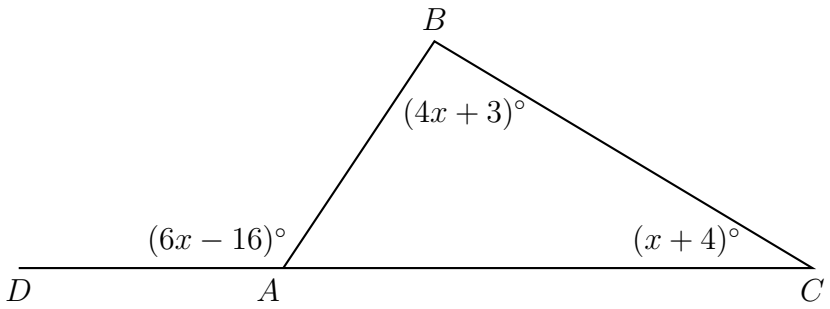
13. A translation maps $D(2,4) \rightarrow D'(-3,4)$. What is the image of $E(5,-5)$ under the same translation?

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)

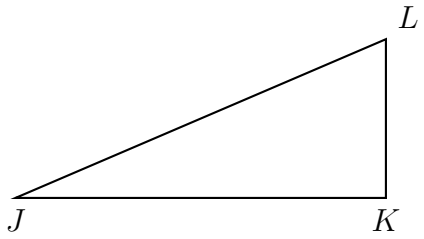


16. In $\triangle ABC$ shown below, side $\overline{AC}$ is extended to point D with $m\angle DAB = (6x - 16)^\circ$, $m\angle C = (x + 4)^\circ$, and $m\angle B = (4x + 3)^\circ$.

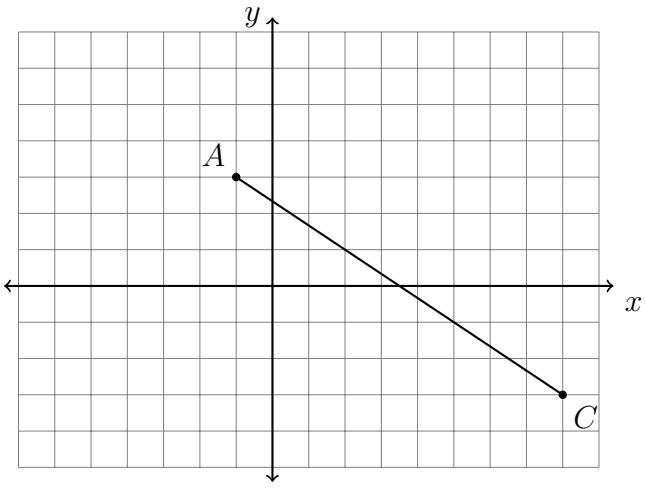


What is $m\angle BAC$?

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.*

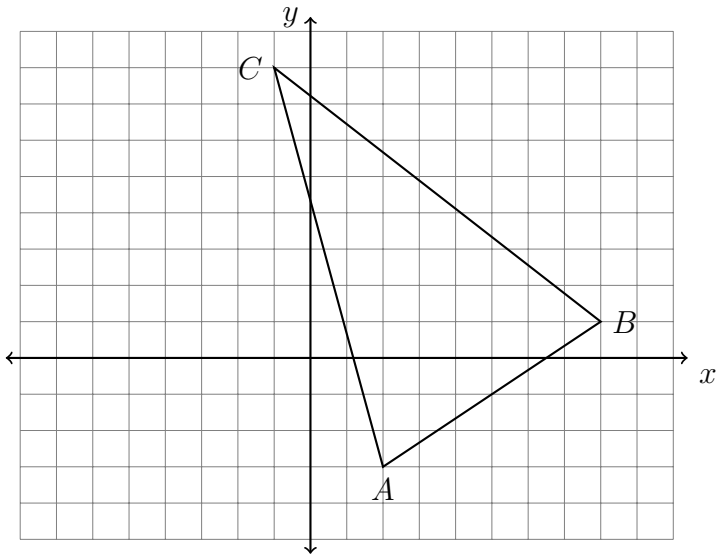


18. In the diagram below, $\overleftrightarrow{AC}$ has endpoints with coordinates $A(-1, 3)$ and $C(8, -3)$.



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 $\triangle ABC$.