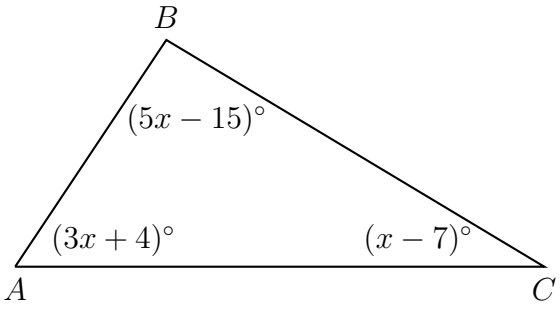
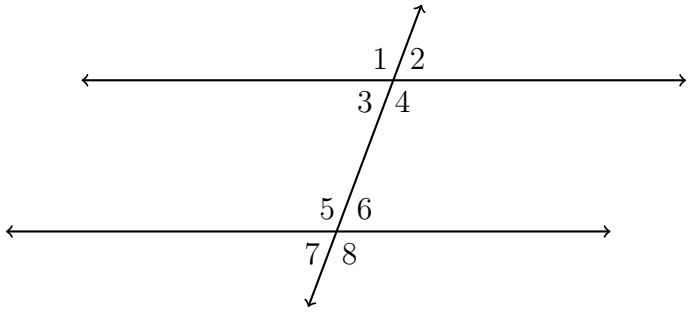
10.1 Homework: Mixed review

1. In $\triangle ABC$ shown below, $m\angle A = (3x+4)^\circ$, $m\angle B = (5x-15)^\circ$, and $m\angle C = (x-7)^\circ$. What is $m\angle A$?



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

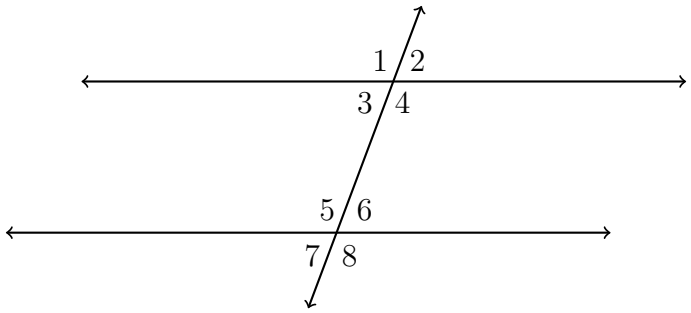


   (a) State the angle corresponding with $\angle 5$.

   (b) Given $m\angle 3 = 78^\circ$ and $m\angle 5 = 3x^\circ$. Find x.

   (c) In a proof, what reason would justify $\angle 3 \cong \angle 6$? _____

3. Given two parallel lines and a transversal, as shown. Apply the theorem, "If a transversal intersects two parallel lines, then corresponding angles are congruent."



   (a) State the angle corresponding with $\angle 2$.

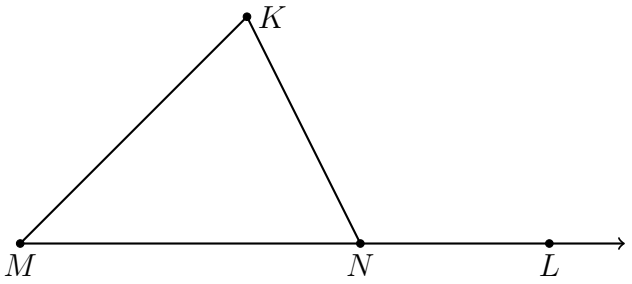
   (b) Given $m\angle 4 = 115°$ and $m\angle 6 = 5x°$. Find x.

   (c) Given $m\angle 7 = 65°$. Find $m\angle 2$.

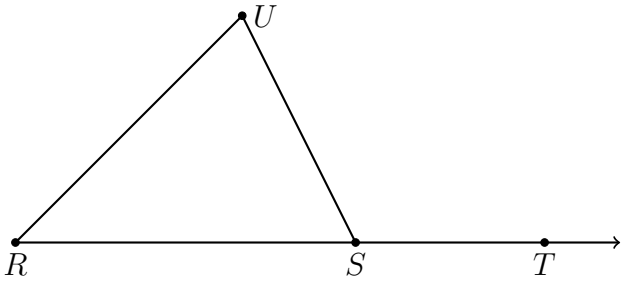
   (d) In a proof, what reason would justify $\angle 4 \cong \angle 5$? _____

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

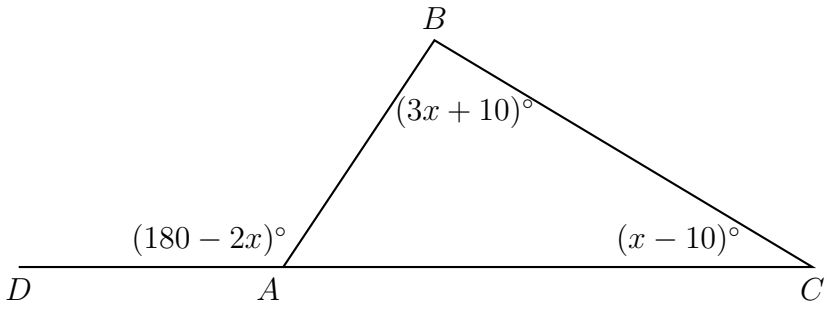
5. Given $m\angle K = 38°$ and $m\angle KNL = 111°$. Find $m\angle M$.



6. Given $m\angle R = 53°$ and $m\angle UST = 117°$. Find $m\angle U$.



7. In $\triangle ABC$ shown below, side $\overline{AC}$ is extended to point D with $m\angle DAB = (180 - 2x)°$, $m\angle C = (x - 10)°$, and $m\angle B = (3x + 10)°$.



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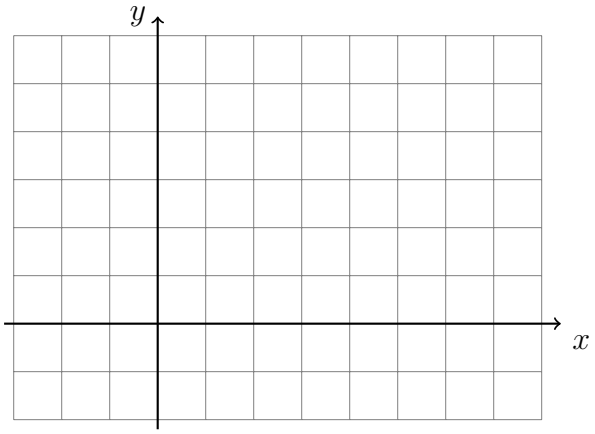
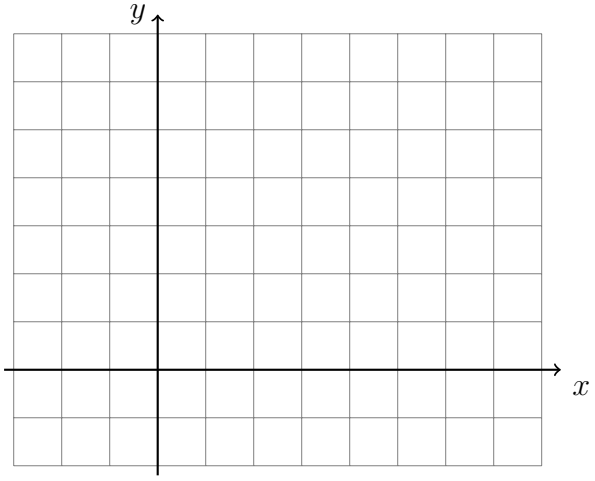
What is $m\angle BAC$?

8. On the graph below, draw $\overline{AB}$, with $A(-2, 1)$ and $B(6, 3)$, labeling the end points. Determine and state the coordinates of the midpoint M of $\overline{AB}$ and mark and label it on the graph.



9. On the graph below, draw $\overline{AB}$, with $A(-1, 5)$ and $B(7, 0)$, labeling the end points. Determine and state the coordinates of the midpoint M of $\overline{AB}$ and mark and label it on the graph.



10. In the diagram below, $\overleftrightarrow{AC}$ has endpoints with coordinates $A(-3, 2)$ and $C(3, -7)$.

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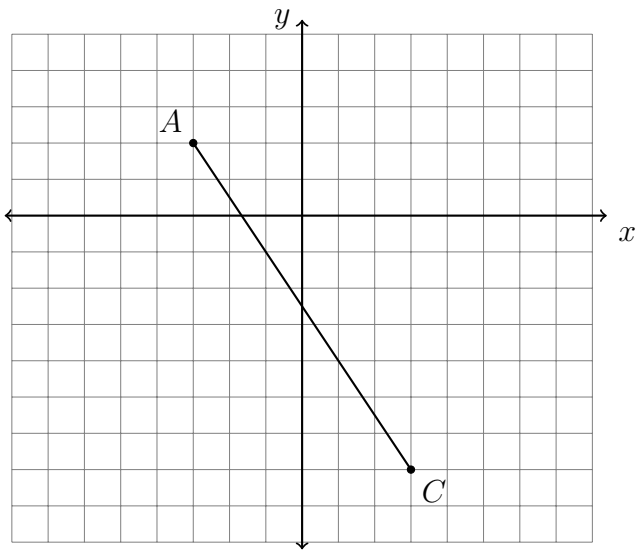


If B is a point on and $AB{:}BC = 1{:}2$, what are the coordinates of B?

11. Apply the translation $(x, y) \to (x - 1, y + 3)$ to the point $A(0, -4)$.

12. Apply the translation $(x, y) \to (x + 1, y + 6)$ to the point $A(-5, 3)$.

13. What is the image of $B(2, 5)$ under a reflection across the y-axis?

14. State the translation that would map $C(2, -3)$ onto $C'(5, -4)$.

15. What is the image of $B(4, 3)$ under a reflection across the x-axis?

16. State the translation that would map $C(1, 5)$ onto $C'(4, 3)$.

17. Express the result to the nearest thousandth.

    (a) $\sin 30° =$ (c) $\sin 28° =$

    (b) $\tan 45° =$ (d) $\cos 25° =$

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

    (a) $\sin 60° =$ (c) $\tan 45° =$

    (b) $\cos 23° =$ (d) $\sin 81° =$

19. Express the result to the nearest thousandth.

    (a) $\cos 60° =$ (c) $\sin 48° =$

    (b) $\tan 45° =$ (d) $\cos 15° =$

20. Express the result to the nearest thousandth.

(a) $\cos 60° =$

(b) $\tan 25° =$

(c) $\sin 41° =$

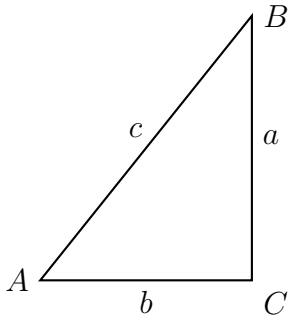
(d) $\cos 75° =$

21. Find the image of $A(3, 2)$ after a translation four to the right and down two.

22. Apply the translation $(x, y) \to (x - 5, y + 1)$ to the point $B(-2, -1)$.

23. State the translation that would map $C(6, 3)$ onto $C'(5, 13)$.

24. $\triangle ABC$ 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) $\sin A =$

(b) $\cos A =$

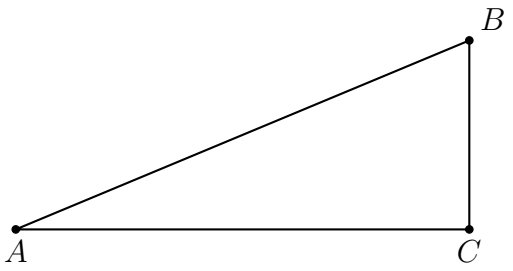
(c) $\tan A =$

(d) $\sin B =$

(e) $\cos B =$

(f) $\tan B =$

25. Given right $\triangle ABC$ with $AC = 12, BC = 5, AB = 13$, $m\angle C = 90°$. Express each trig ratio as a fraction.



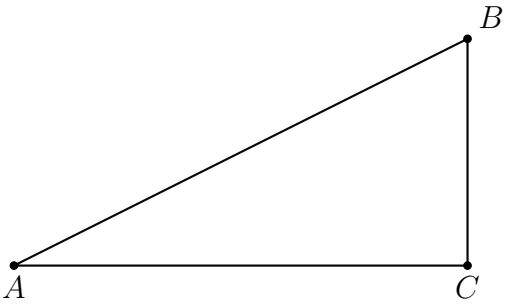
(a) $\sin A =$

(c) $\sin B =$

(b) $\cos A =$

(d) $\tan B =$

26. Given right $\triangle ABC$ with $m\angle C = 90°$, $m\angle A = 30°$, and $AB = 12$.



(a) Find AC.

(b) Find BC.

27. Given right $\triangle JKL$ with $\overline{JK} \perp \overline{KL}$, $JL = 11$, $m\angle J = 29°$.

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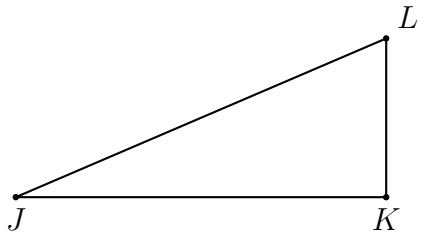
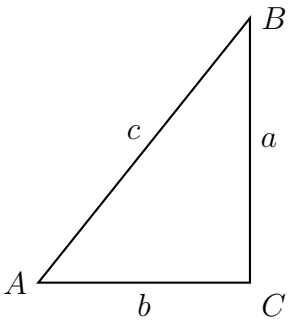


(a) Find the length JK

(b) Find the length KL

28. $\triangle ABC$ 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.

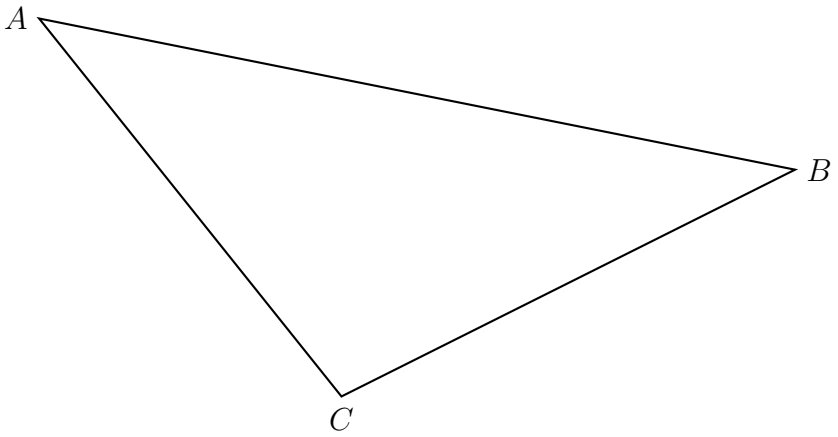


(a) $\sin A =$

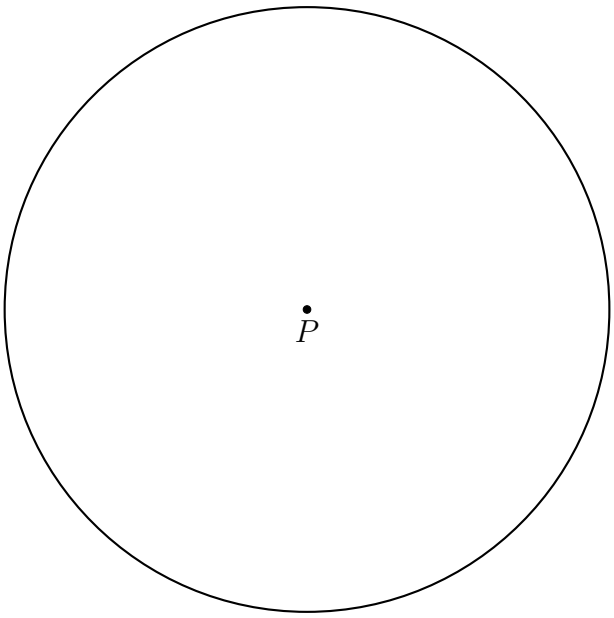
(b) $\cos A =$

(c) $\tan A =$

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



30. With a compass and straightedge, construct a square inscribed in circle P. (Leave all construction marks.)



31. $A(3,1)$ is one endpoint of $\overline{AB}$. The segment's midpoint is $M(7,6)$. Find the other endpoint, B.

32. $M(5,5)$ is the midpoint of AB. Given $A(2,3)$, find the other endpoint, B.

33. The line l has the equation $y = \frac{1}{2}x - 3$.
    (a) What is the slope of the line k, given $k \parallel l$?

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

34. The line l has the equation $y = -\frac{3}{2}x - 7$.
    (a) What is the slope of the line k, given $k \parallel l$?

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

35. Given $P(-2,9)$ and $Q(3,-3)$, find the length of $\overline{PQ}$.

36. A translation maps $A(5, 2) \to A'(-2, 3)$. What is the image of $B(-1, 5)$ under the same translation?

37. Apply the translation $(x, y) \to (x - 2, y + 4)$ to the point $A(2, -1)$.

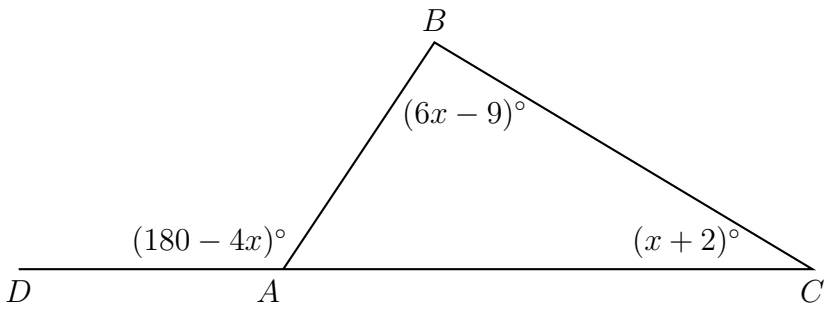
38. What is the image of $B(2, 7)$ under a reflection across the x-axis?

39. State the translation that would map $C(-3, 1)$ onto $C'(4, 0)$.

40. A translation maps $D(1, 9) \to D'(4, 3)$. What is the image of $E(6, -2)$ under the same translation?

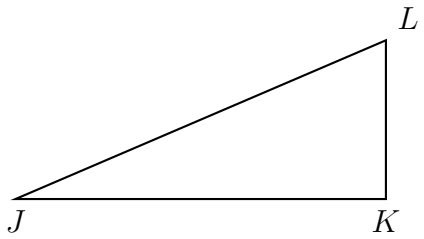
41. The image of triangle ABC after a translation is $\triangle A'B'C'$. Is the area of the triangle greater, smaller, or the same after the translation? Justify your answer.

42. In $\triangle ABC$ shown below, side $\overline{AC}$ is extended to point D with $m\angle DAB = (180 - 4x)°$, $m\angle C = (x + 2)°$, and $m\angle B = (6x - 9)°$.

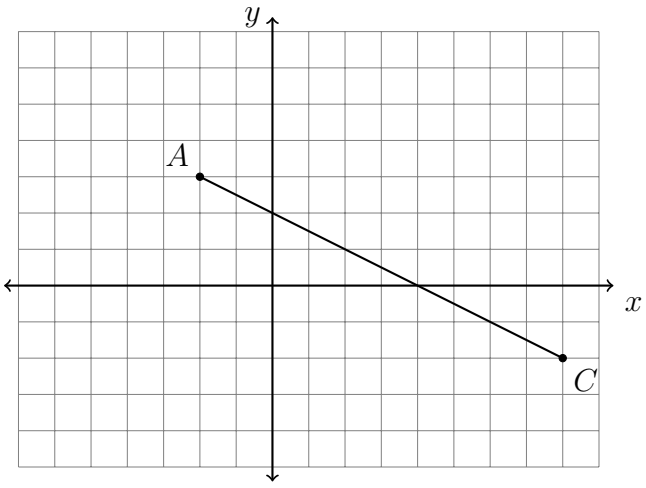


What is $m\angle BAC$?

43. Given right $\triangle JKL$ with $\overline{JK} \perp \overline{KL}$, $JL = 9$, $m\angle J = 32°$. Find the length JK, *rounded to the nearest thousandth.*

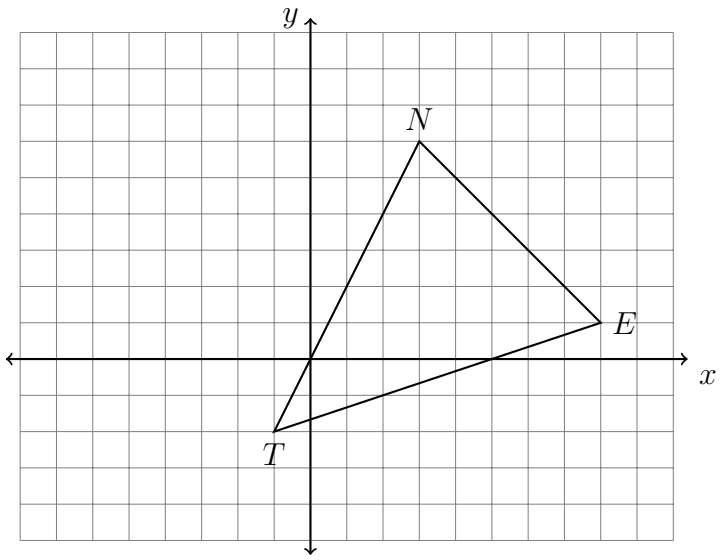


44. Spicy: In the diagram below, $\overleftrightarrow{AC}$ has endpoints with coordinates $A(-2, 3)$ and $C(8, -2)$.



If B is a point on $\overline{AC}$ and $AB{:}BC = 2{:}3$, what are the coordinates of B?

45. Spicy: Triangle $\triangle TEN$ is graphed on the set of axes below. The vertices of $\triangle TEN$ have the coordinates $T(-1,-2)$, $E(8,1)$, and $N(3,6)$.



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

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

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

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