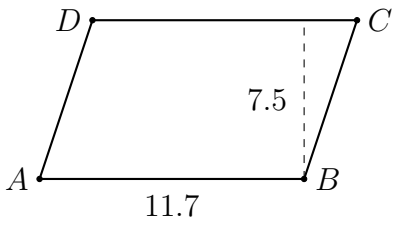
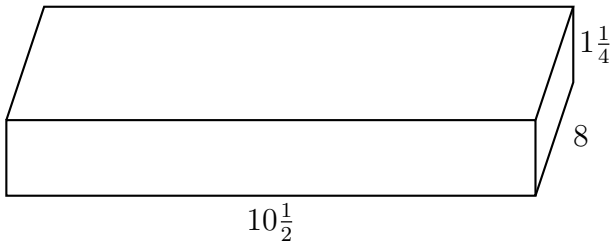
4.11 Exam: Transversals, volume; angle relationships

1. Find the area of the parallelogram $ABCD$ shown below, with $AB = 11.7$ and height $h = 7.5$.

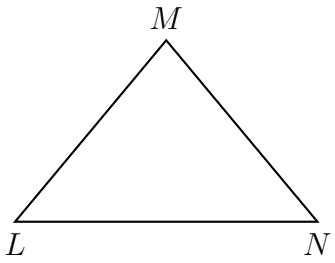


2. Find the sum of the measures of the internal angles of a hexagon. Show the formula.

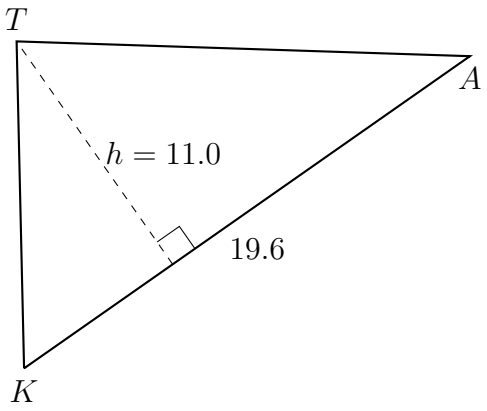
3. A wooden cutting board is $10\frac{1}{2}$ inches long, 8 inches wide, and $1\frac{1}{4}$ inches thick. Find the volume of the box. Show the calculation.



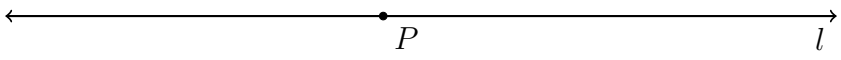
4. Given isosceles $\triangle LMN$ with $\overline{LM} \cong \overline{NM}$. If $m\angle L = 2x + 20$ and $m\angle N = 3x + 5$, find $m\angle M$.



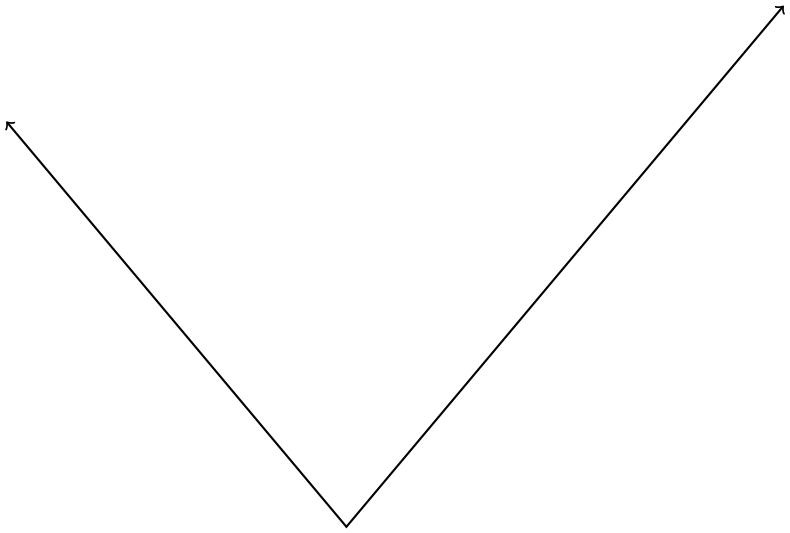
5. Find the area of $\triangle KAT$. The altitude h of the triangle is 11.0 centimeters and the base $KA = 19.6$ cm. Show work by writing an equation before making the calculation.



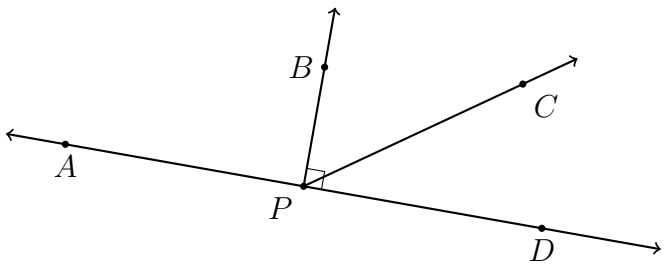
6. Construct a line perpendicular to l though P. (show construction marks, but make no extra marks)



7. Complete the construction of the bisector of the given angle. (show construction marks, but make no extra marks)



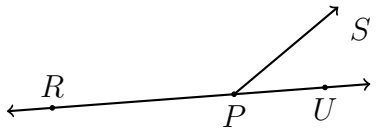
8. Angles APC and CPD form a linear pair. $m\angle APC = 10x+15$ and $m\angle CPD = 3x-4$. Find $m\angle CPD$. Check your answer for full credit.



Do Not Solve. Circle the appropriate equation, cite a justification:

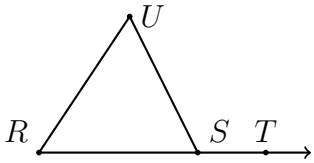
- "definition of bisector"
- "linear pairs sum to 180°"
- "vertical ∠s are ≅"
- "alternate interior ∠s are ≅"
- "corresponding ∠s of ∥ lines are ≅"
- "same-side interior ∠s are supplementary"
- "⊥ rays with complementary ∠s adding to 90°"

9. $\overleftrightarrow{RPU}$ with ray $\overrightarrow{PS}$.



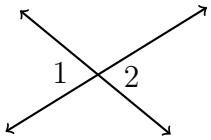
$\angle RPS \cong \angle SPU$ $m\angle RPS + m\angle SPU = 180°$ _____

10. Given $m\angle R = m\angle U = 65$, and $m\angle UST = 130$. Find $m\angle RSU$.



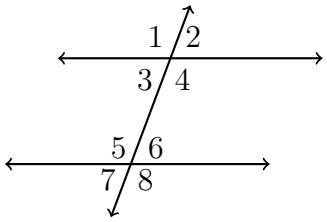
$\angle UST \cong \angle RSU$ $m\angle UST + m\angle RSU = 180$ _____

11. Given $m\angle 1 = 4x + 6$, $m\angle 2 = 6x - 32$. Find $m\angle 1$.



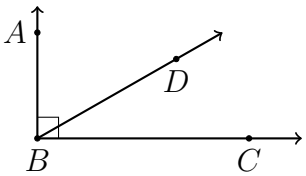
$\angle 1 \cong \angle 2$ $m\angle 1 + m\angle 2 = 180$ _____

12. Given two parallel lines and a transversal, as shown.



$\angle 4 \cong \angle 5$ $m\angle 3 + m\angle 6 = 180$ _____

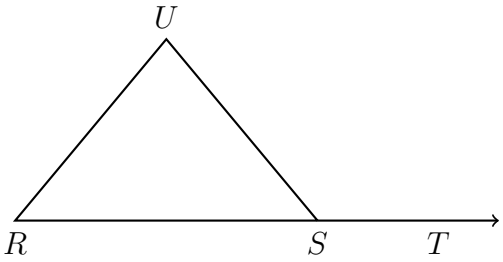
13. Given $\overrightarrow{BA} \perp \overrightarrow{BC}$, $m\angle ABD = 2x - 5$, and $m\angle DBC = x - 10$.



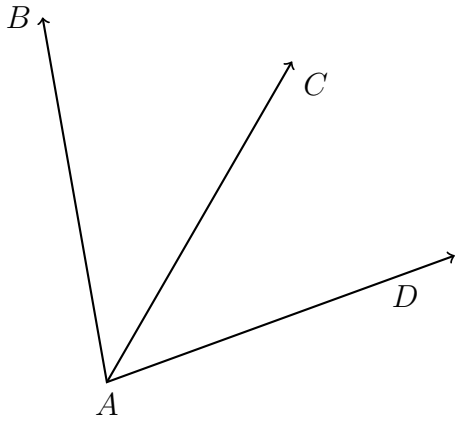
$\angle ABD \cong \angle DBC$ $m\angle ABD + m\angle DBC = 90$ _____

14. The measures in degrees of the three angles of a triangle are $3x$, $\frac{1}{2}x + 7$, and $5x - 65$. Find x.

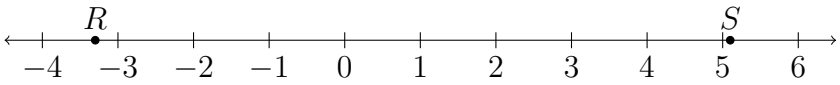
15. Given isosceles $\triangle RSU$ with $\overline{UR} \cong \overline{US}$. If $m\angle UST = x$ and $m\angle R = x - 80$, find $m\angle U$.



16. An angle bisector is shown below, with $\overrightarrow{AC}$ bisecting $\angle BAD$. Given $m\angle BAC = 3x+5$ and $m\angle BAD = 7x - 1$, find $m\angle BAD$. (Show check)



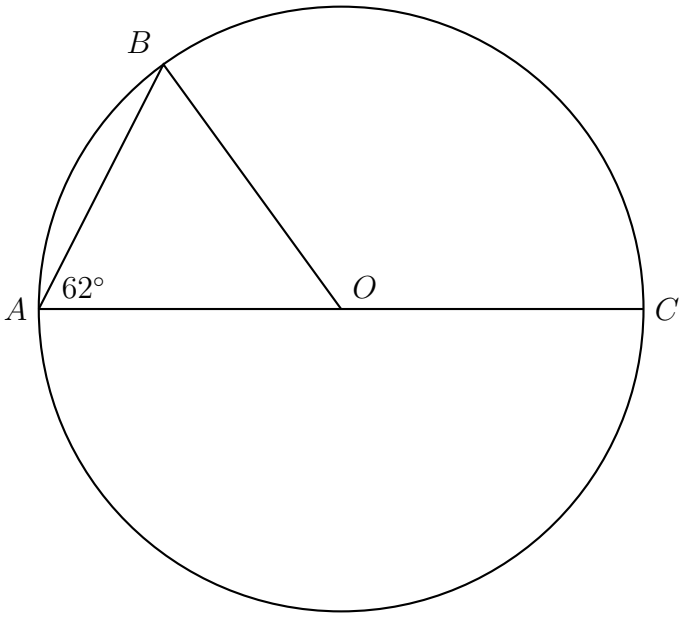
17. Given $\overleftrightarrow{RS}$ as shown on the number line, with $R = -3.3$ and $S = 5.1$.



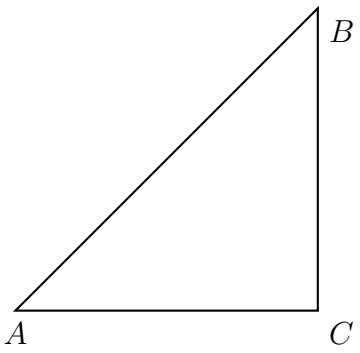
(a) What is the exact distance on the number line between the points R and S?

(b) The point T bisects $\overline{RS}$. Find the value of T, and mark and label it on the numberline $\overleftrightarrow{RS}$ shown above.

18. The circle O is shown below with diameter $\overline{AOC}$ and radius $\overline{BO}$. It is given that $m\angle BAO = 62°$. Find the measure of the central angle $\angle AOB$.

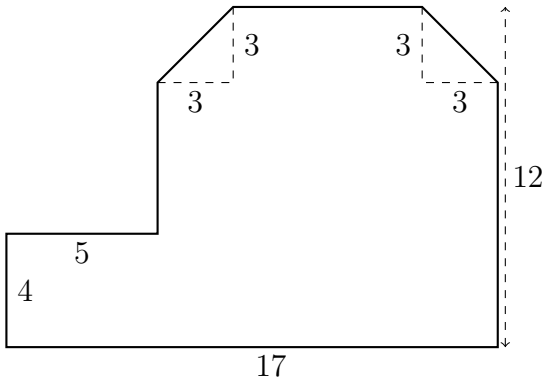


19. Given isosceles right $\triangle ABC$ with $\overline{AC} \cong \overline{BC}$ and $\overline{AC} \perp \overline{BC}$. Find $m\angle A$.



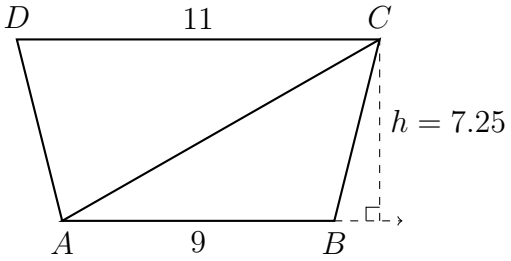
20. A sheet metal part is cut with square corners and two 45° cutouts as shown with lengths marked in centimeters.

    (a) Find the area of the figure. (the drawing is not to scale)

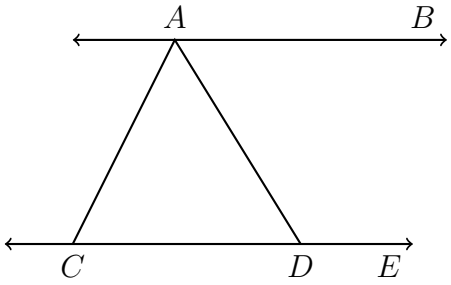


    (b) Spicy: The weight of the sheet metal is 2.25 grams per square centimeter. Find the weight of the part.

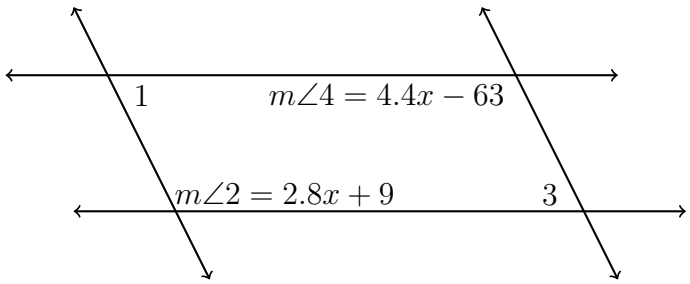
21. The trapezoid $ABCD$ has two parallel sides, $\overline{AB} \parallel \overline{CD}$ with lengths $AB = 9$ and $CD = 11$. The trapezoid's height is $h = 7.25$. Find the area of the trapezoid.



22. Given parallel lines $\overleftrightarrow{AB} \parallel \overleftrightarrow{CDE}$ with $\overline{AC} \cong \overline{CD}$. If $m\angle BAD = 63$ find $m\angle ACD$.

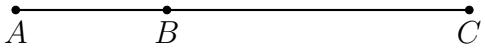


23. Two parallel lines intersect a second set of parallel lines. Given $m\angle 2 = 2.8x + 9$ and $m\angle 4 = 4.4x - 63$, find the measure of $\angle 1$.

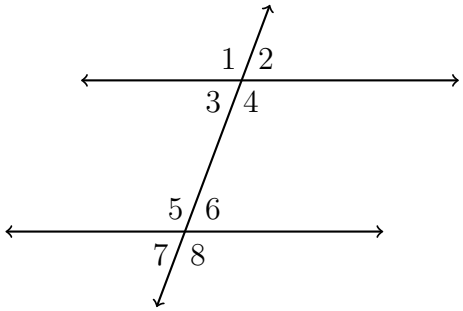


Do Not Solve!
Model the situation with an equation in terms of x.

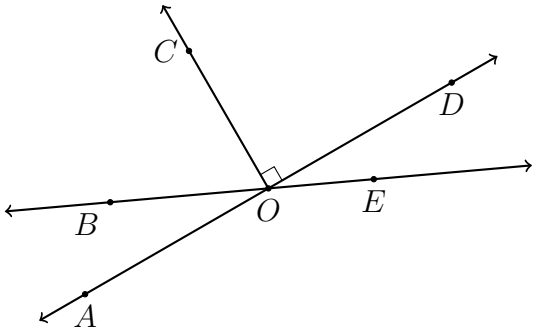
24. Given $\overline{ABC}$, with $AB = 2x - 1$, $BC = 3x + 7$, and $AC = 21$. Find x.



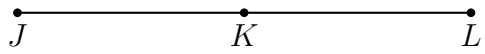
25. Given $m\angle 3 = x + 35$ and $m\angle 5 = 4x - 25$. Find x.



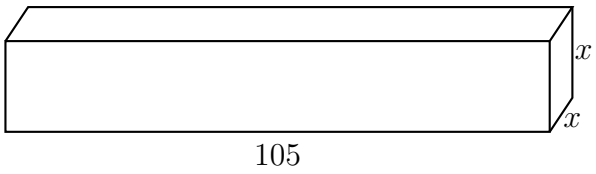
26. In the diagram below $m\angle AOB = 6x + 5$ and $m\angle COB = 8x + 15$. Find x.



27. The point K is the midpoint of $\overline{JL}$, $JK = 3x + 15$, and $JL = 9x + 9$. Find x.

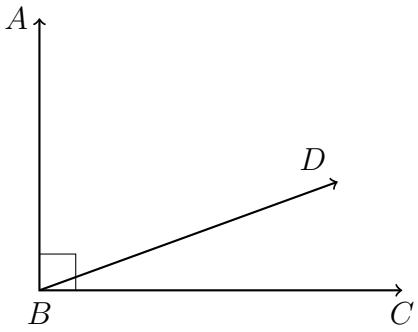


28. A feeding trough in the shape of a rectangular prism is 105 inches long. The trough's cross section is square. If its volume is 15,120 cubic inches, what is the dimension of each side of its square end, x? (drawing not to scale)



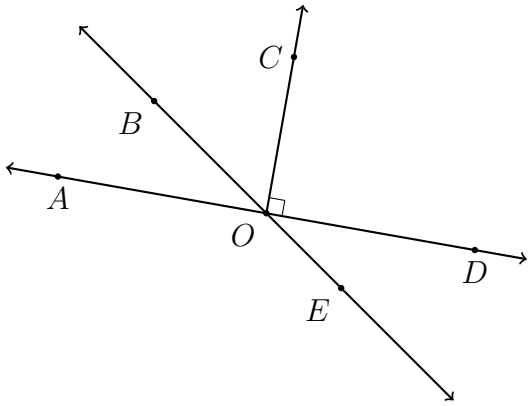
29. Given $\overrightarrow{BA} \perp \overrightarrow{BC}$, $m\angle ABD = 2x$, and $m\angle DBC = x - 15$. Find $m\angle DBC$.

    For full credit, show the check using both angle measures.

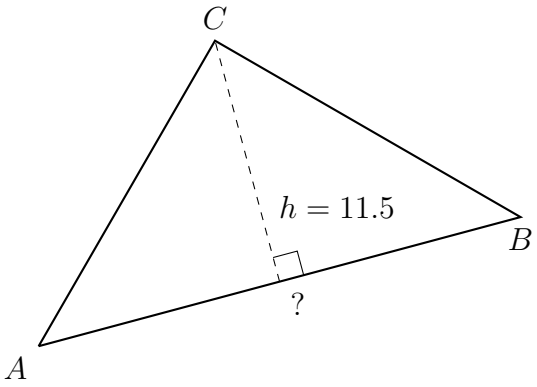


Early finishers

30. In the diagram below $m\angle AOB = 3x + 11$ and $m\angle DOE = 5x - 3$. Find $m\angle DOE$. (Calculate $m\angle AOB$ as a check)

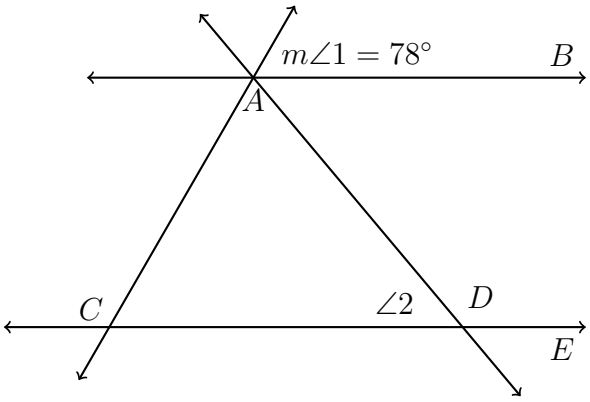


31. One side of the $\triangle ABC$ has a height $h = 11.5$. The triangle's area is 103.5. Find the length of the side $\overline{AB}$.

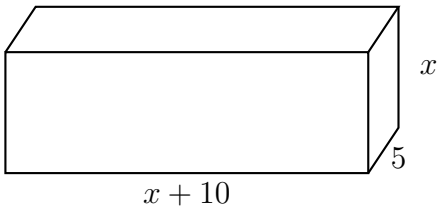


32. Of two complementary angles, the measure of $\angle A$ is five times that of $\angle B$. Find $m\angle A$.

33. Given parallel lines $\overleftrightarrow{AB} \parallel \overleftrightarrow{CDE}$ with $\overline{AD} \cong \overline{CD}$. If $m\angle 1 = 78$ find $m\angle 2$.

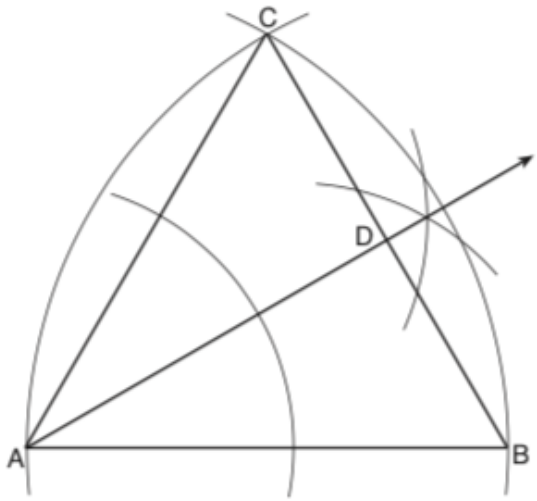


34. The volume of the rectanglar prism shown is 120 cubic feet. Its length is length is ten feet longer than its height x. Its depth is 5 feet. Find the length of the prism. (not drawn to scale)



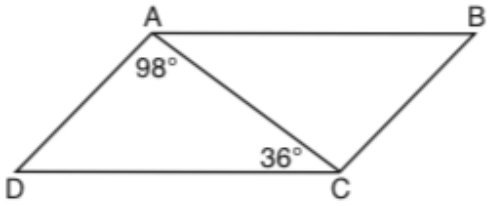
35. Regents problem 1

Using the construction below, state the degree measure of $\angle CAD$. Explain why.



36. Regents problem 2

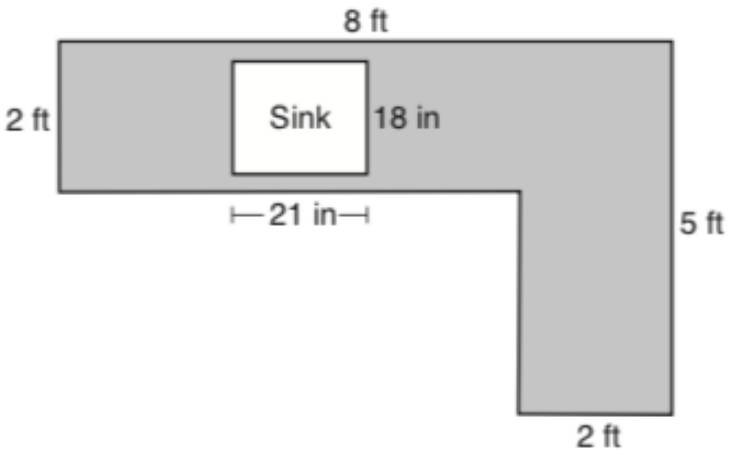
In parallelogram $ABCD$ shown below, $m\angle DAC = 98°$ and $m\angle ACD = 36°$.



What is the measure of angle B? Explain why.

37. Regents problem 3

A countertop for a kitchen is modeled with the dimensions shown below. An 18-inch by 21-inch rectangle will be removed for the installation of the sink.



What is the area of the top of the installed countertop, to the *nearest square foot*?