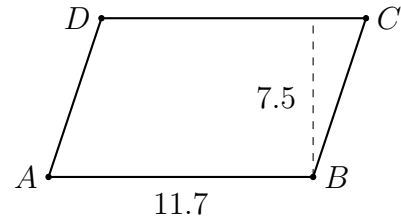


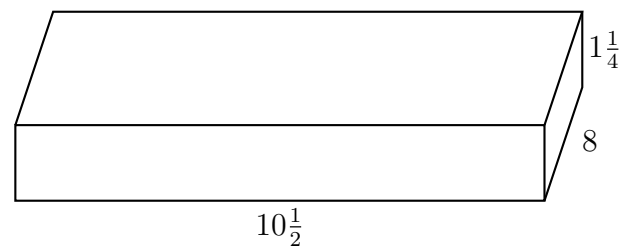
4.11 Exam: Transversals, volume; angle relationships

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

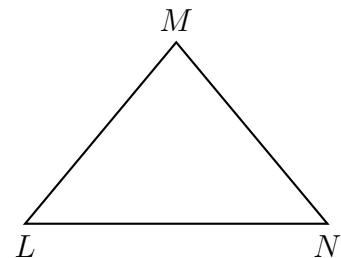


2. Find the sum of the measures of the internal angles of a hexagon. Show the formula.

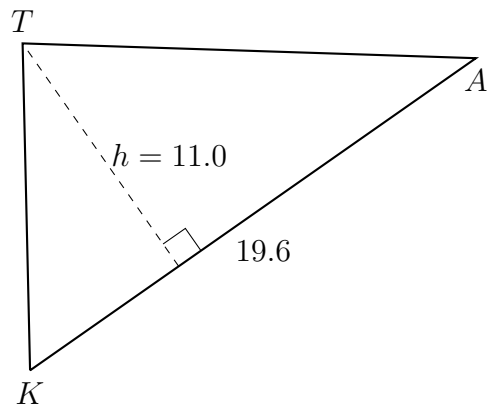
3. A wooden cutting board is $10\frac{1}{2}$ inches long, 8 inches wide, and $1\frac{1}{4}$ inches thick. Find the volume of the box. Show the calculation.



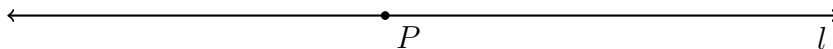
4. Given isosceles $\triangle LMN$ with $\overline{LM} \cong \overline{NM}$. If $m\angle L = 2x + 20$ and $m\angle N = 3x + 5$, find $m\angle M$.



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.

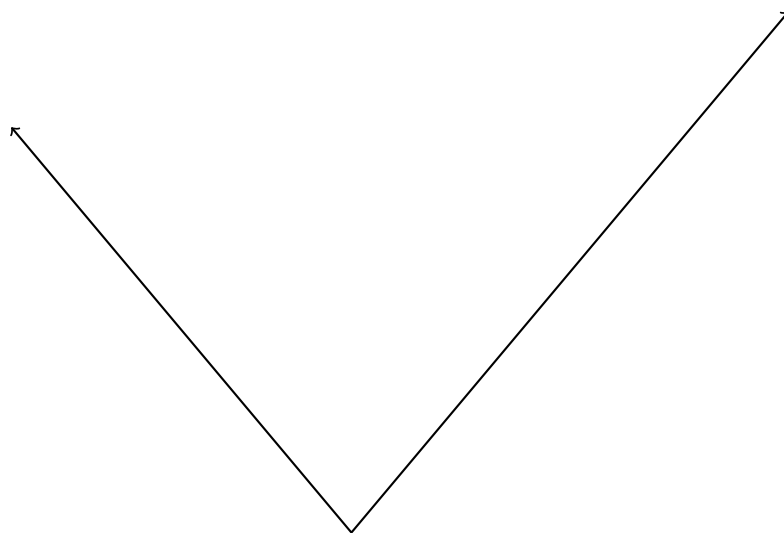


6. Construct a line perpendicular to l through P .

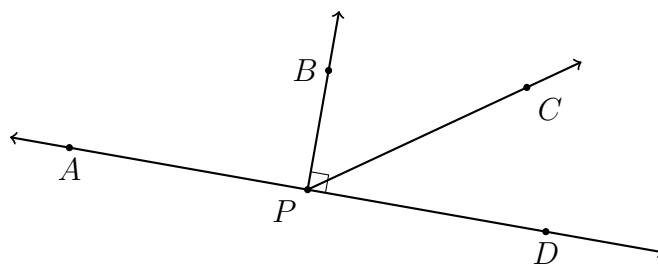


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7. Complete the construction of the bisector of the given angle.



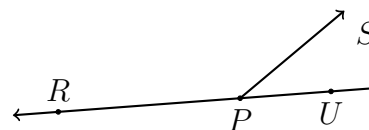
8. Angles APC and CPD form a linear pair. $m\angle APC = 10x + 15$ and $m\angle CPD = 3x - 4$. Find $m\angle CPD$. Check your answer for full credit.



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

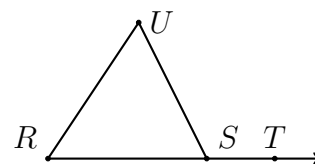
- “definition of bisector”
- “linear pairs sum to 180° ”
- “vertical \angle s are \cong ”
- “alternate interior \angle s are \cong ”
- “corresponding \angle s of \parallel lines are \cong ”
- “same-side interior \angle s are supplementary”
- “ \perp rays with complementary \angle s adding to 90° ”

9. $\overleftrightarrow{RP\bar{U}}$ with ray \overrightarrow{PS} .



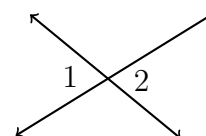
$$\angle RPS \cong \angle SPU \quad m\angle RPS + m\angle SPU = 180^\circ \quad \underline{\hspace{2cm}}$$

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



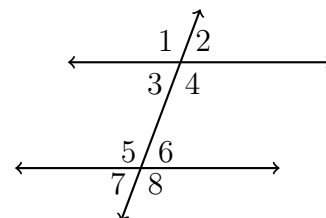
$$\angle UST \cong \angle RSU \quad m\angle UST + m\angle RSU = 180 \quad \underline{\hspace{2cm}}$$

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



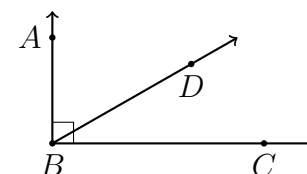
$$\angle 1 \cong \angle 2 \quad m\angle 1 + m\angle 2 = 180 \quad \underline{\hspace{2cm}}$$

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



$$\angle 4 \cong \angle 5 \quad m\angle 3 + m\angle 6 = 180 \quad \underline{\hspace{2cm}}$$

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

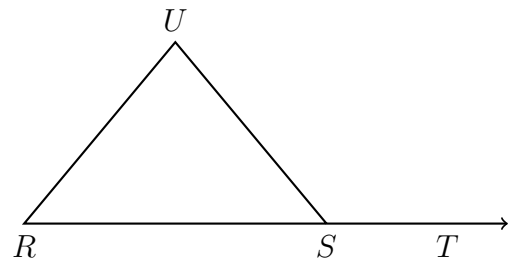


$$\angle ABD \cong \angle DBC \quad m\angle ABD + m\angle DBC = 90 \quad \underline{\hspace{2cm}}$$

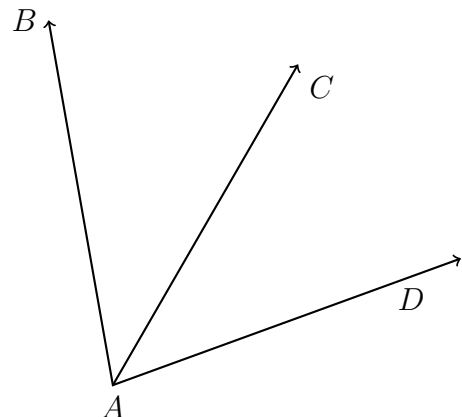
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14. The measures in degrees of the three angles of a triangle are $3x$, $\frac{1}{2}x + 7$, and $5x - 65$. Find x .

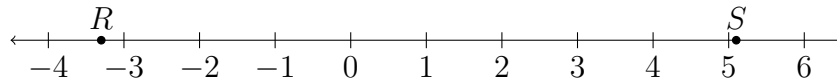
15. Given isosceles $\triangle RSU$ with $\overline{UR} \cong \overline{US}$. If $m\angle UST = x$ and $m\angle R = x - 80$, find $m\angle U$.



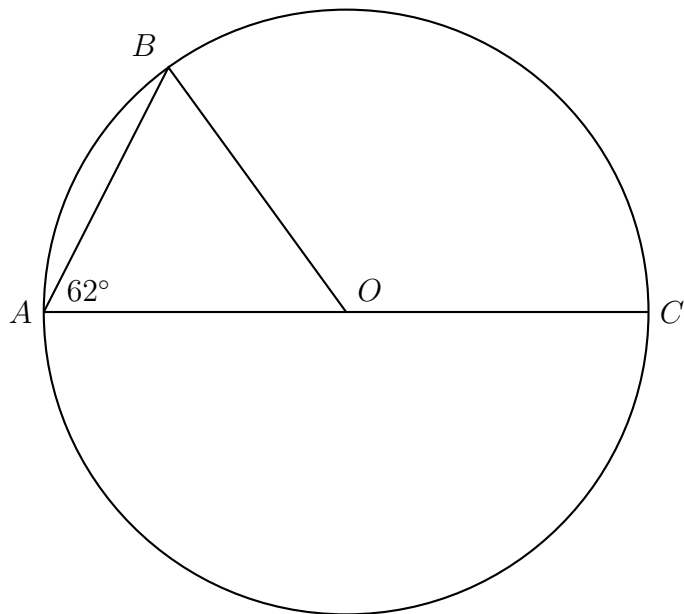
16. An angle bisector is shown below, with \overrightarrow{AC} bisecting $\angle BAD$. Given $m\angle BAC = 3x + 5$ and $m\angle BAD = 7x - 1$, find $m\angle BAD$. (Show check)



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

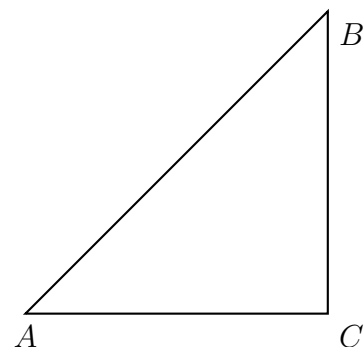


- (a) What is the exact distance on the number line between the points R and S ?
- (b) The point T bisects \overleftrightarrow{RS} . Find the value of T , and mark and label it on the numberline \overleftrightarrow{RS} shown above.
18. The circle O is shown below with diameter \overline{AOC} and radius \overline{BO} . It is given that $m\angle BAO = 62^\circ$. Find the measure of the central angle $\angle AOB$.



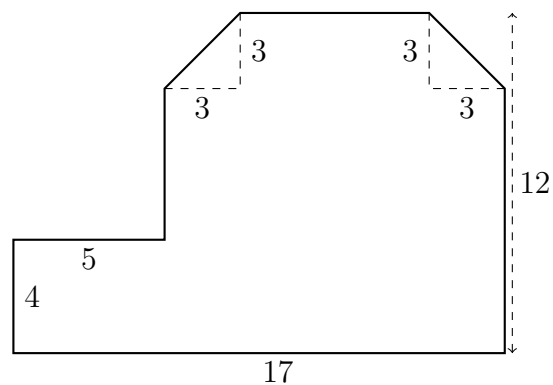
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19. Given isosceles right $\triangle ABC$ with $\overline{AC} \cong \overline{BC}$ and $\overline{AC} \perp \overline{BC}$. Find $m\angle A$.



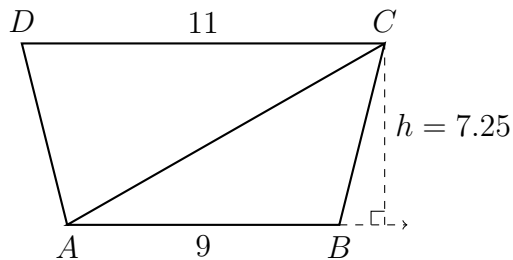
20. A sheet metal part is cut with square corners and two 45° cutouts as shown with lengths marked in centimeters.

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

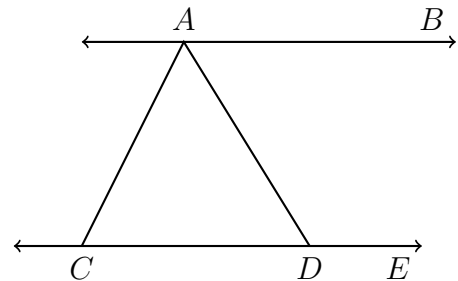


- (b) Spicy: The weight of the sheet metal is 2.25 grams per square centimeter. Find the weight of the part.

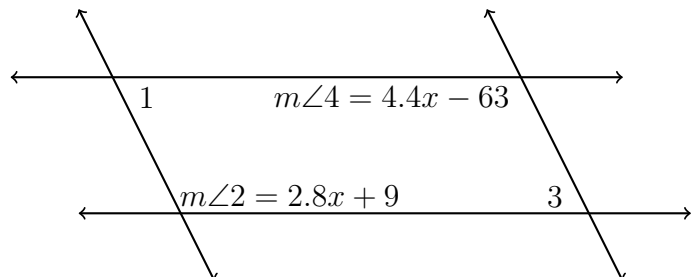
21. The trapezoid $ABCD$ has two parallel sides, $\overline{AB} \parallel \overline{CD}$ with lengths $AB = 9$ and $CD = 11$. The trapezoid's height is $h = 7.25$. Find the area of the trapezoid.



22. Given parallel lines $\overleftrightarrow{AB} \parallel \overleftrightarrow{CE}$ 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 $\angle 1$.

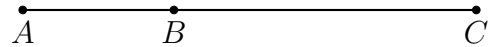


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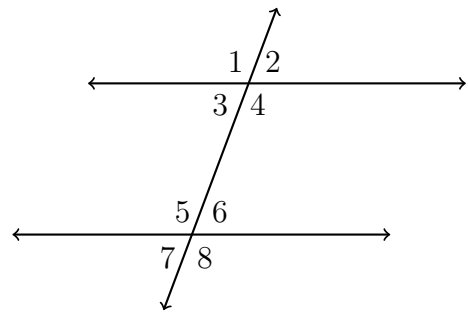
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Do Not Solve!**Model the situation with an equation in terms of x .**

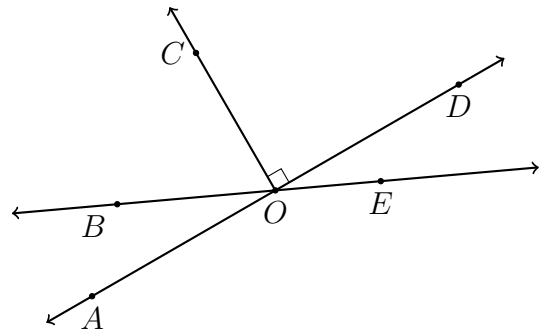
24. Given \overline{ABC} , with $AB = 2x - 1$, $BC = 3x + 7$, and $AC = 21$. Find x .



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



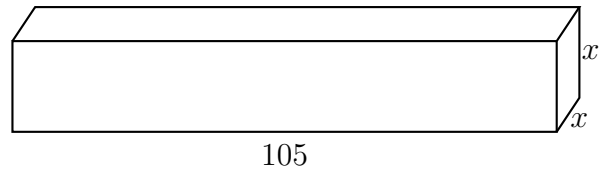
26. In the diagram below $m\angle AOB = 6x + 5$ and $m\angle COB = 8x + 15$. Find x .



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

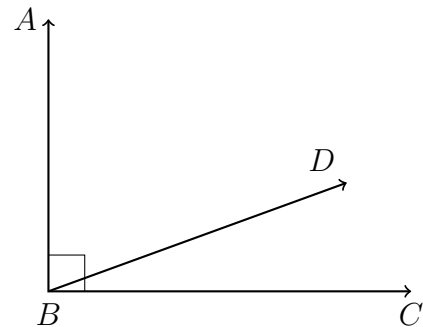


28. A feeding trough in the shape of a rectangular prism is 105 inches long. The trough's cross section is square. If its volume is 15,120 cubic inches, what is the dimension of each side of its square end, x ? (drawing not to scale)



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

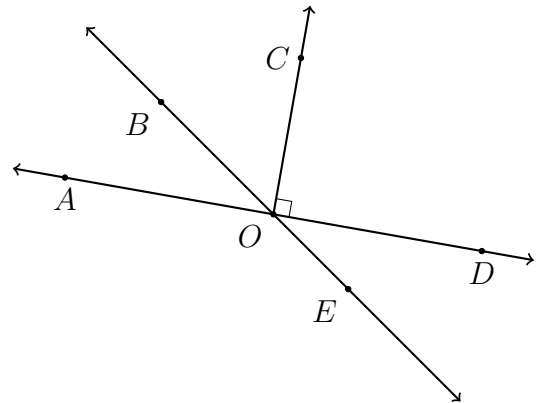
For full credit, show the check using both angle measures.



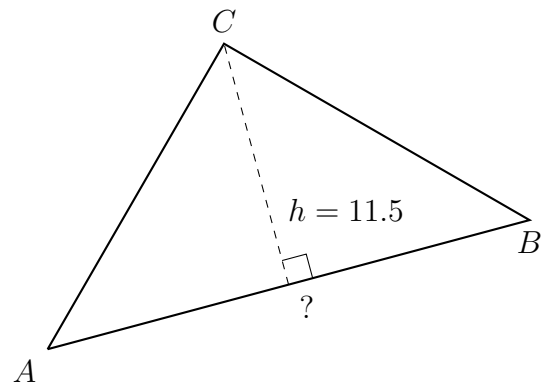
Early finishers

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)

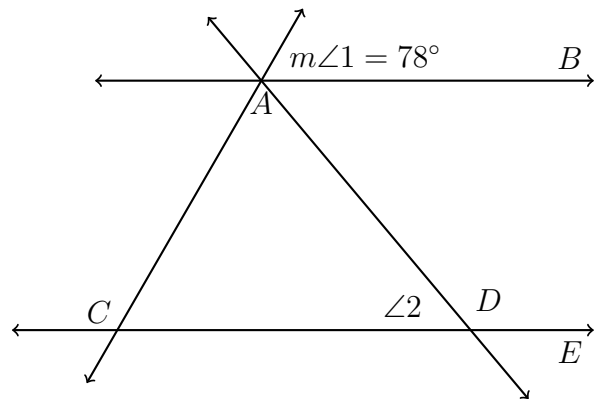


31. One side of the $\triangle ABC$ has a height $h = 11.5$. The triangle's area is 103.5. Find the length of the side \overline{AB} .

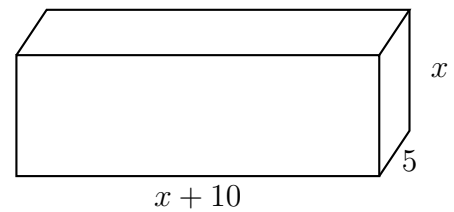


32. Of two complementary angles, the measure of $\angle A$ is five times that of $\angle B$. Find $m\angle A$.

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

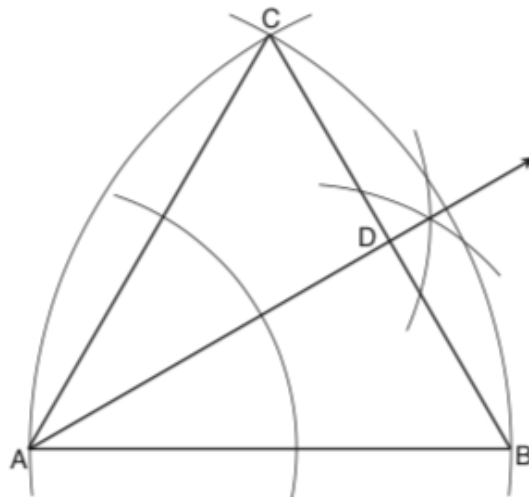


34. The volume of the rectangular prism shown is 120 cubic feet. Its length is length is ten feet longer than its height x . Its depth is 5 feet. Find the length of the prism.
(not drawn to scale)



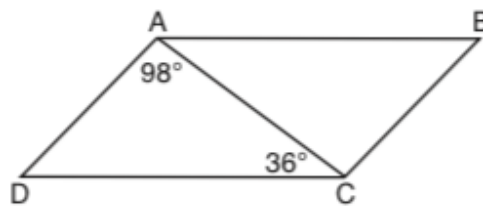
35. Regents problem 1

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



36. Regents problem 2

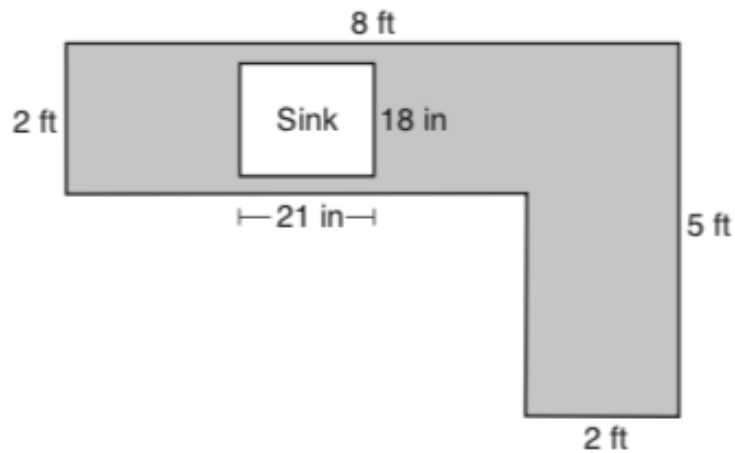
In parallelogram $ABCD$ shown below, $m\angle DAC = 98^\circ$ and $m\angle ACD = 36^\circ$.



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*?