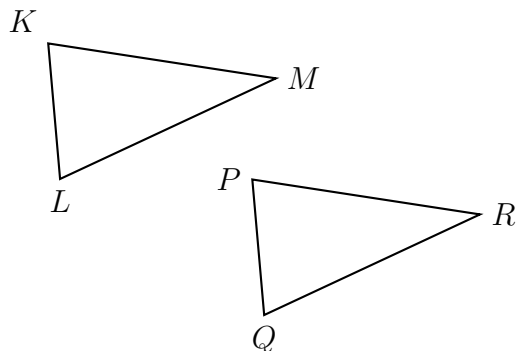


22 November 2019

5.11b Exam: Transformational Geometry

1. A translation maps triangle KLM onto triangle PQR .

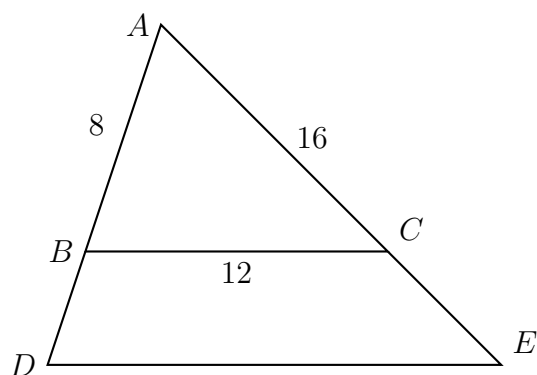


- (a) $L \rightarrow$ _____
 (b) $\angle M \cong$ _____
 (c) $\overline{KM} \cong$ _____
 (d) _____ $\cong \overline{QR}$

Write each corresponding object.

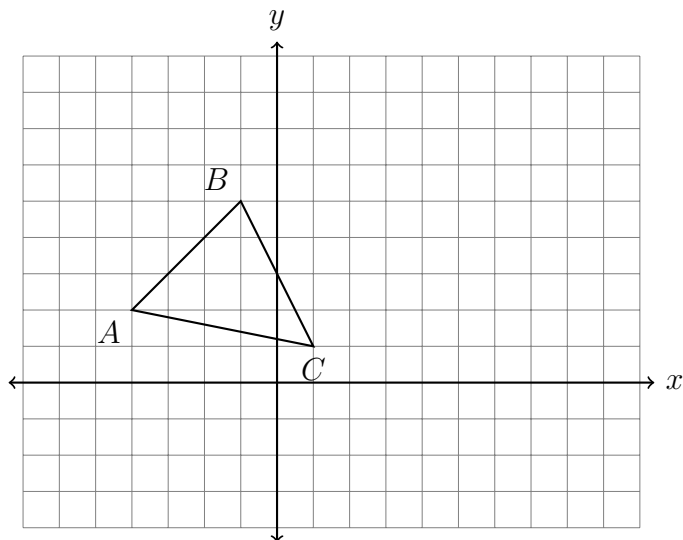
2. Triangle ABC is dilated with a scale factor of $k = 1.5$ centered at A , yielding $\triangle ADE$, as shown. Given $AB = 8$, $BC = 12$, and $AC = 16$.

Find AD , DE , and CE .

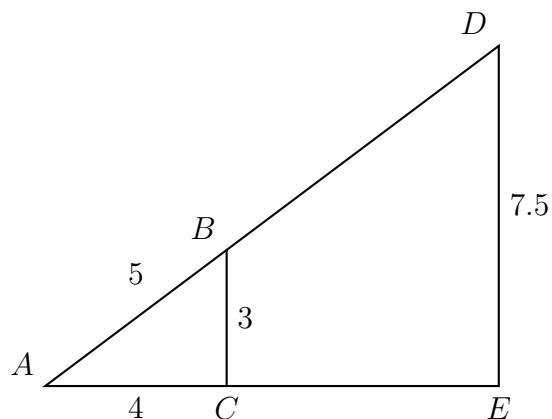


3. Find the image of $P(-4, 0)$ after the translation $(x, y) \rightarrow (x - 10, y + 2)$.

4. Translate $\triangle ABC$ by $(x, y) \rightarrow (x + 6, y - 3)$. Make a table of the coordinates and plot and label the image on the axes.



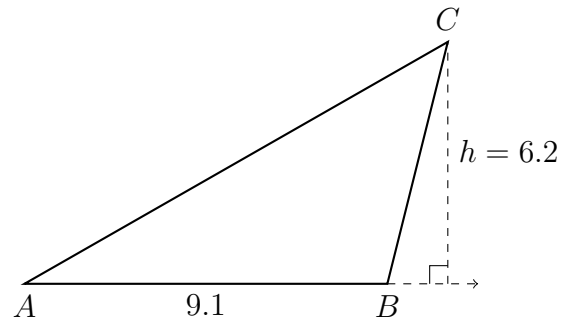
5. A dilation centered at A maps $\triangle ABC \rightarrow \triangle ADE$. Given the sides of the preimage, $AC = 4$, $BC = 3$, $AB = 5$, and of $DE = 7.5$ find the scale factor k and the lengths AD and AE .



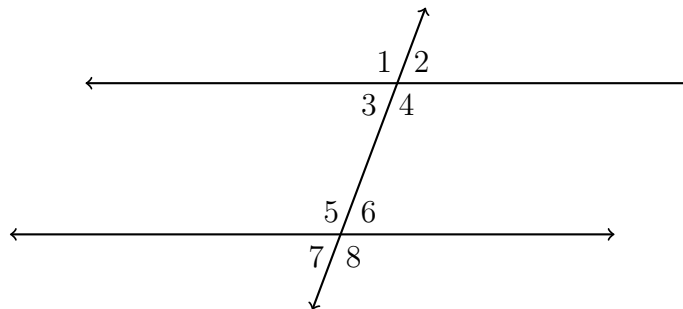
6. Given $\triangle ABC \sim \triangle DEF$. $m\angle A = 40^\circ$ and $m\angle E = 35^\circ$. Find the measure of $\angle C$.
(*hint: the order of corresponding letters match*)

Name: _____

7. The side \overline{AB} of triangle ABC is extended and an altitude to the vertex C is drawn, as shown below. The triangle's height is $h = 6.2$ and its base measures $AB = 9.1$. Find the area of the triangle.



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



- State the angle corresponding with $\angle 7$.
- What theorem would justify $m\angle 4 + m\angle 6 = 180^\circ$? _____
- What theorem would justify $\angle 3 \cong \angle 6$? _____
- Given $m\angle 1 = 117^\circ$ and $m\angle 8 = (4x - 3)^\circ$. Find x .

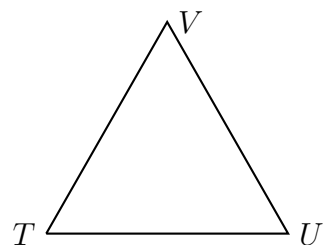
9. A translation maps $X(1, 7) \rightarrow X'(-3, 9)$.

(a) What translation was applied (be specific)?

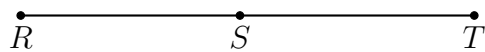
(b) What is the image of $Y(0, -3)$ under the same translation?

10. Given isosceles $\triangle TUV$ with $\overline{TU} \cong \overline{UV}$ and $m\angle T = 55$. Mark the triangle in the diagram and find $m\angle U$ and $m\angle V$.

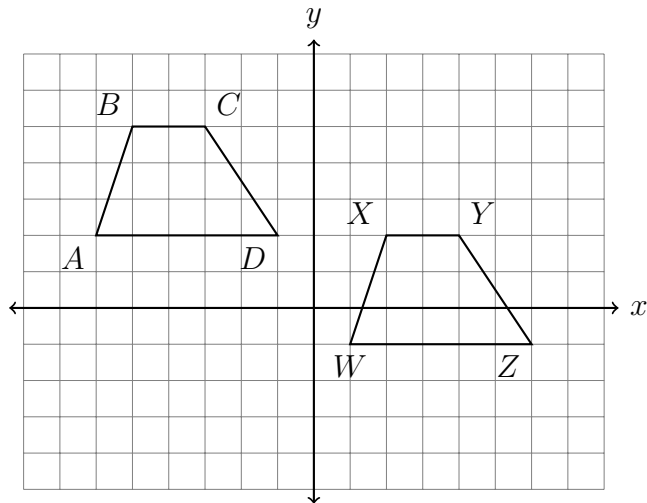
(the diagram is not to scale)



11. The points R , S , and T are collinear, with $RS = 4x - 8$, $ST = 21$, and $RT = 6x - 1$. Mark the diagram and find RT .



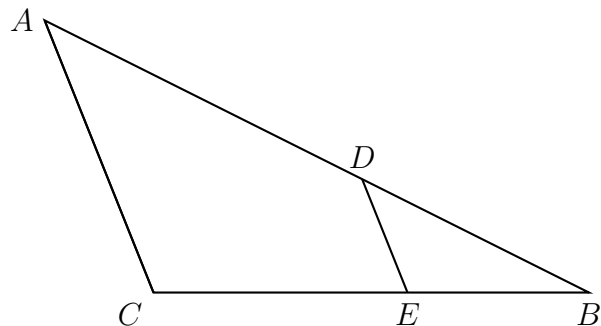
12. The trapezoid $ABCD$, shown below, undergoes a rigid transformation carrying it onto trapezoid $WXYZ$. State the transformation. (be specific)



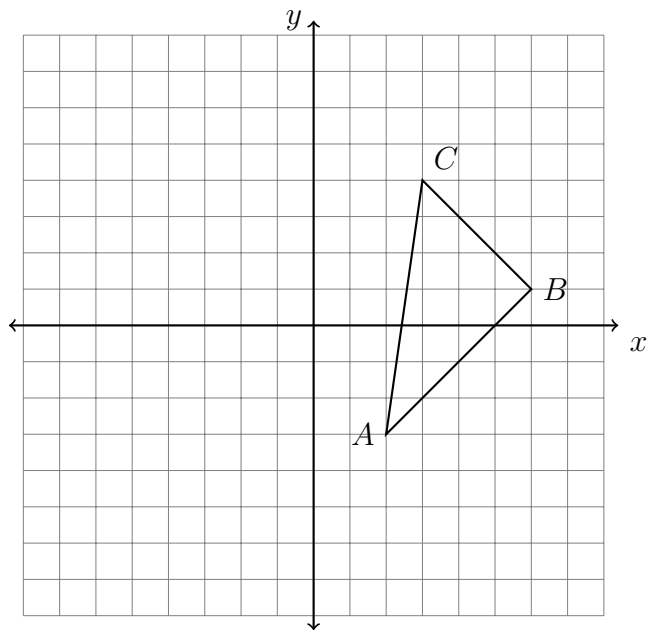
13. Given $\triangle ABC$ point D on \overline{AB} and point E on \overline{BC} such that $\triangle ABC \sim \triangle DBE$.

Given $AB = 15$, $BC = 10$, and $AD = 9$. Mark the lengths on the triangle, showing DB as well.

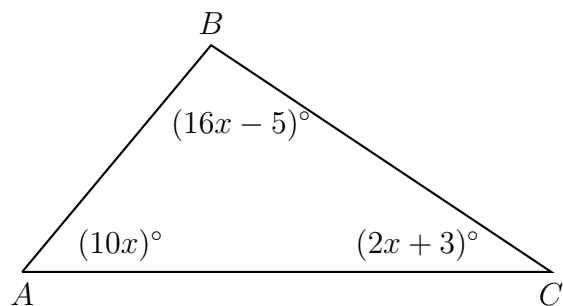
Find the length of \overline{BE} .



14. $\triangle ABC$ is shown with vertices $A(2, -3)$, $B(6, 1)$, and $C(3, 4)$. Translate the triangle to the left seven units and down two units. Write down its coordinates in a table and plot and label it on the graph.

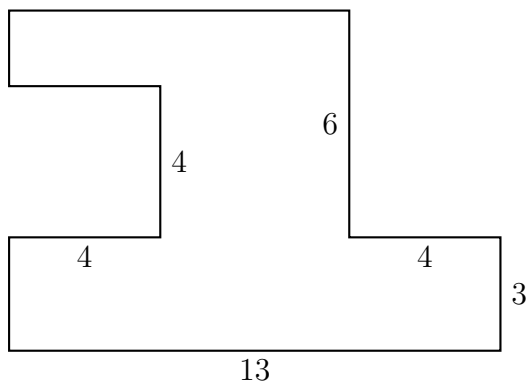


15. In $\triangle ABC$ shown below, $m\angle A = (10x)^\circ$, $m\angle B = (16x - 5)^\circ$, and $m\angle C = (2x + 3)^\circ$. Find $m\angle A$. (show the check for full credit)

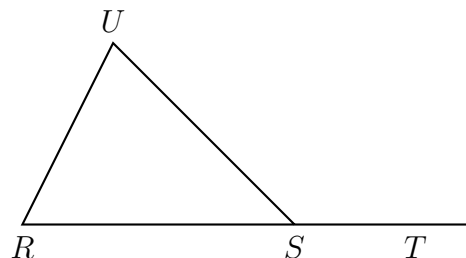


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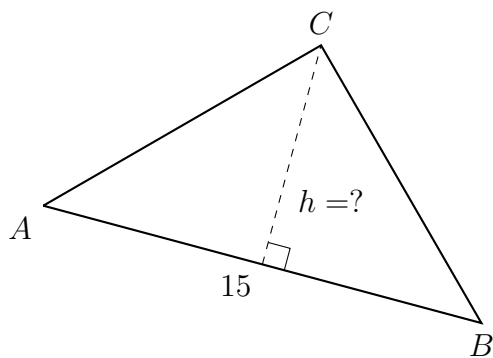
16. The shape shown below is composed of straight lines and right angles, with some lengths as marked. Find the area of the figure. (the figure is not drawn to scale)



17. Given isosceles $\triangle RSU$ with $\overline{US} \cong \overline{RS}$. If $m\angle UST = 150$ find $m\angle U$.



18. One side of the $\triangle ABC$ has a length $AB = 15$. The triangle's area is $71\frac{1}{4}$. Find the length of the altitude h of the triangle.



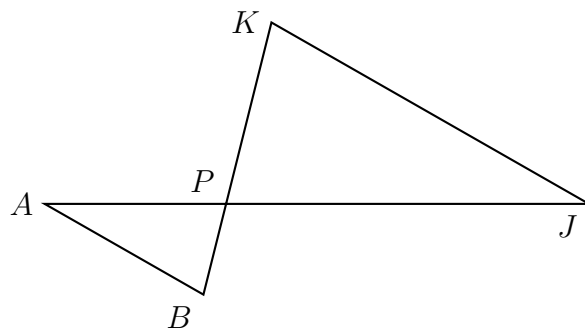
19. The point K is the midpoint of \overline{JL} , $JK = 3x + 11$, and $JL = 9x + 1$. Mark the line on the right and find JK .



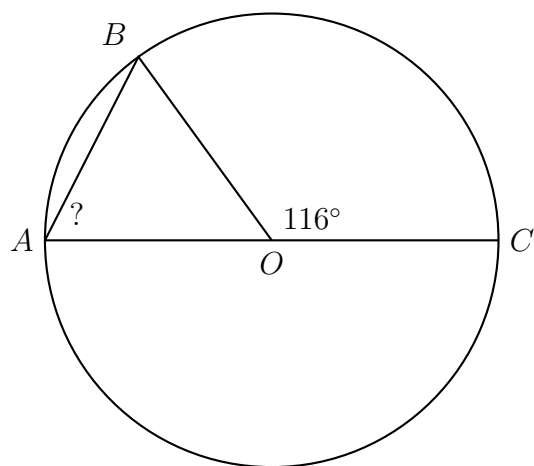
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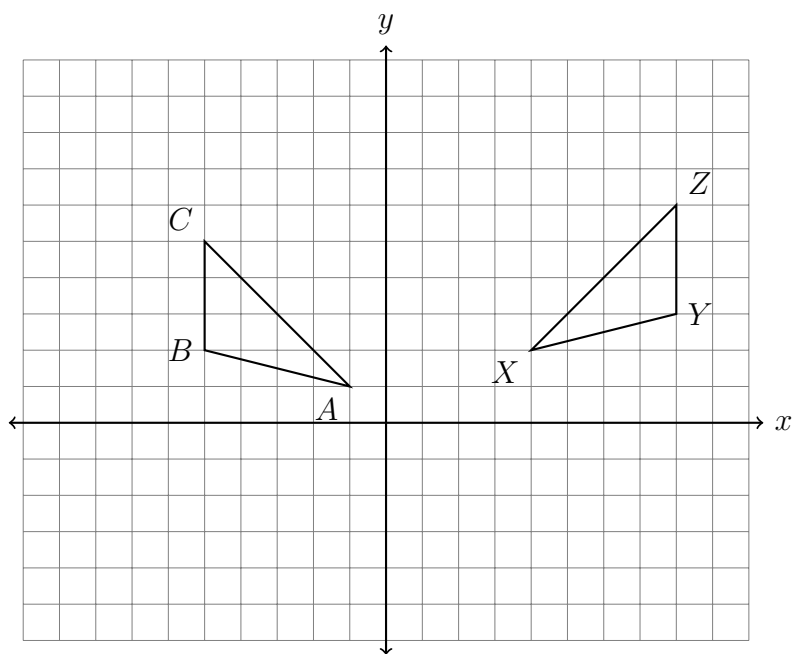
20. Given $\triangle ABP \sim \triangle JKP$ as shown below. $AB = 11.2$, $AP = 8.9$, $BP = 5.0$, and $JK = 22.4$. Find JP .



21. The circle O is shown below with diameter \overline{AOC} and radius \overline{BO} . Given that the central angle $m\angle COB = 116^\circ$. Find the measure of angle A , that is, $m\angle BAO$.

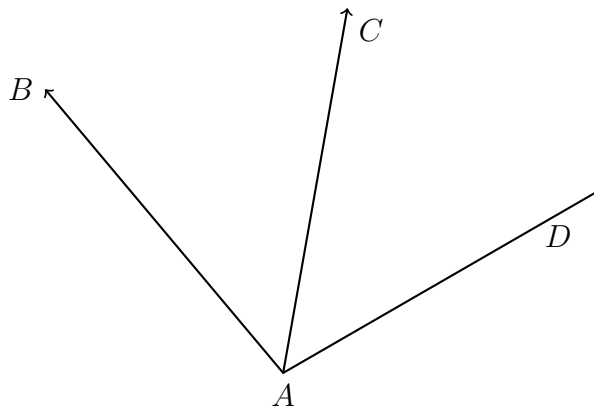


22. The triangle ABC , shown below, undergoes two rigid motions carrying it onto triangle XYZ . State the two isometric transformations. (be specific)

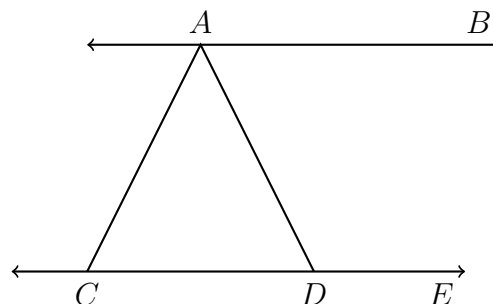


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23. An angle bisector is shown below, with \overrightarrow{AC} bisecting $\angle BAD$. Given $m\angle BAC = 6x + 1$ and $m\angle BAD = 14x - 15$, find $m\angle BAD$. (Show check)

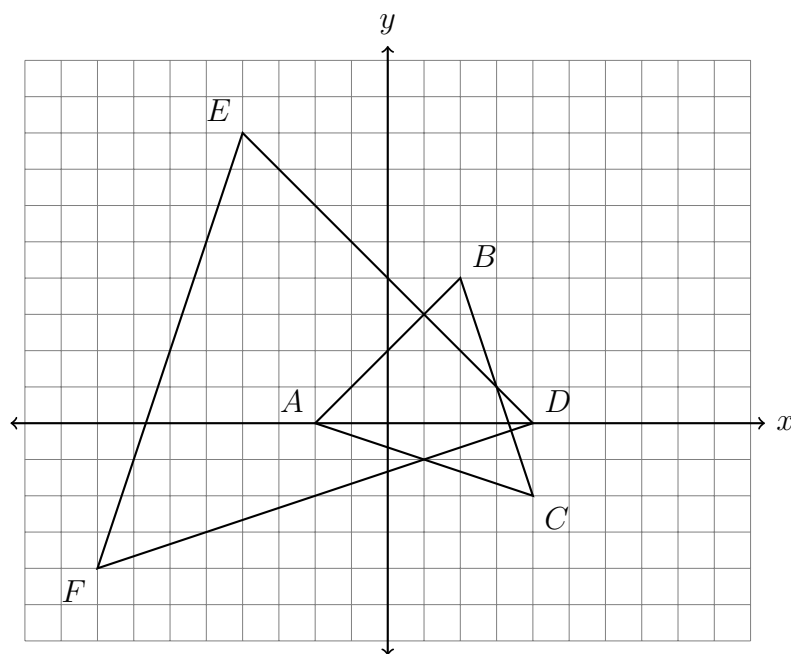


24. Given parallel lines $\overleftrightarrow{AB} \parallel \overleftrightarrow{CDE}$ with $\overline{AC} \cong \overline{CD}$. If $m\angle BAD = 68$ find $m\angle ACD$.



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

26. On the set of axes below, $\triangle ABC$ has vertices at $A(-2, 0)$, $B(2, 4)$, $C(4, -2)$, and $\triangle DEF$ has vertices at $D(4, 0)$, $E(-4, 8)$, $F(-8, -4)$.



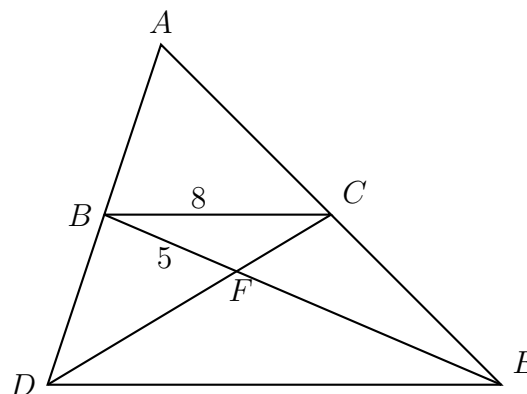
Which transformations map $\triangle ABC \rightarrow \triangle DEF$? Mark each statement True or False

- | | | |
|--|------|-------|
| (a) A dilation with a scale factor of -2 centered at the origin | True | False |
| (b) A dilation with a scale factor of $\frac{1}{2}$ centered at point A | True | False |
| (c) A dilation with a scale factor of 2 centered at the origin, followed by a rotation of 180° about the origin | True | False |
| (d) A dilation with a scale factor of 2 centered at the origin, followed by a reflection across the y -axis | True | False |

27. Triangle ADE and its midline \overline{BC} are drawn, with B the midpoint of \overline{AD} and C the midpoint of \overline{AE} . The two medians \overline{BE} and \overline{CD} are drawn, as shown, intersecting in point F , the centroid.

$\triangle FCB \sim \triangle FDE$ with scale factor $k = 2$. Given $BC = 8$ and $BF = 5$.

Find DE and FE .



28. In $\triangle ABC$ shown below, side \overline{AC} is extended to point D with $m\angle DAB = (11x + 12)^\circ$, $m\angle C = (3x + 3)^\circ$, and $m\angle B = (9x + 2)^\circ$.

What is $m\angle BAC$?

