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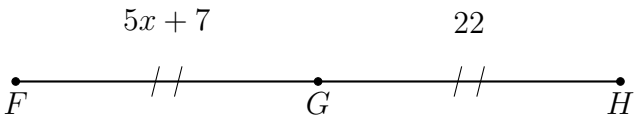
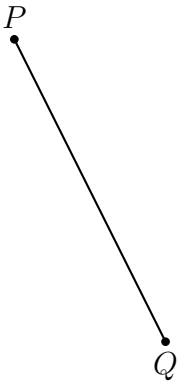
4.14 Exam: Trigonometry and Cumulative Review

1. Point G bisects $\overline{FH}$, with $FG = 5x + 7$, $GH = 22$. Find x.

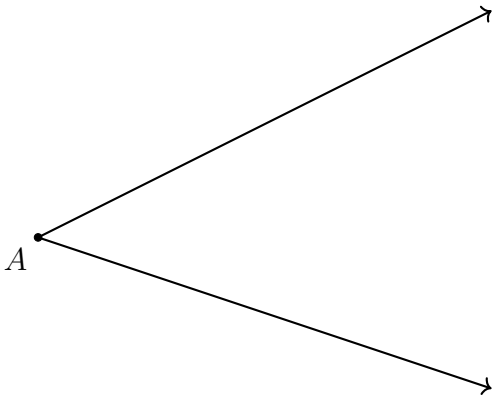


G.CO.12 Make and justify formal geometric constructions

2. Construct a perpendicular bisector of $\overline{PQ}$.

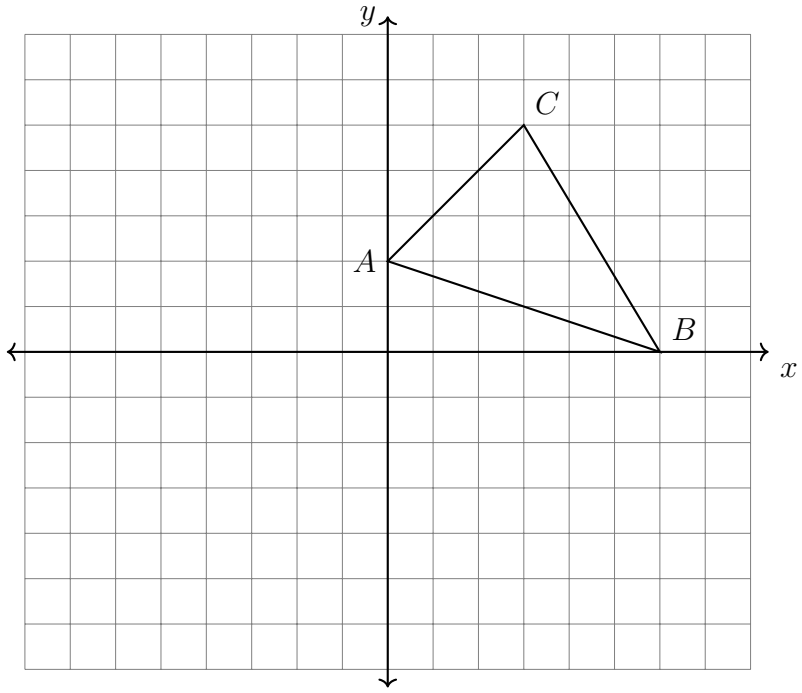


3. Construct the angle bisector of $\angle A$.



G.CO.5 Transform a figure using translation, reflection, or rotation

4. Reflect $\triangle ABC$ across the x-axis. Label the image $\triangle A'B'C'$ on the graph.



5. A translation maps $P(2, 3) \rightarrow P'(-5, 0)$. What is the image of $Q(6, 2)$ under the same translation?

6. The translation mapping $x \rightarrow x + 4$ and $y \rightarrow y - 5$ is applied to $\triangle ABC$.

   (a) Write as coordinate pairs the vertices of the image, $\triangle A'B'C'$

   $A(-1, 2) \rightarrow$

   $B(3, -2) \rightarrow$

   $C(0, 1) \rightarrow$

   (b) Which triangle is larger, or are they the same size? Justify your answer.

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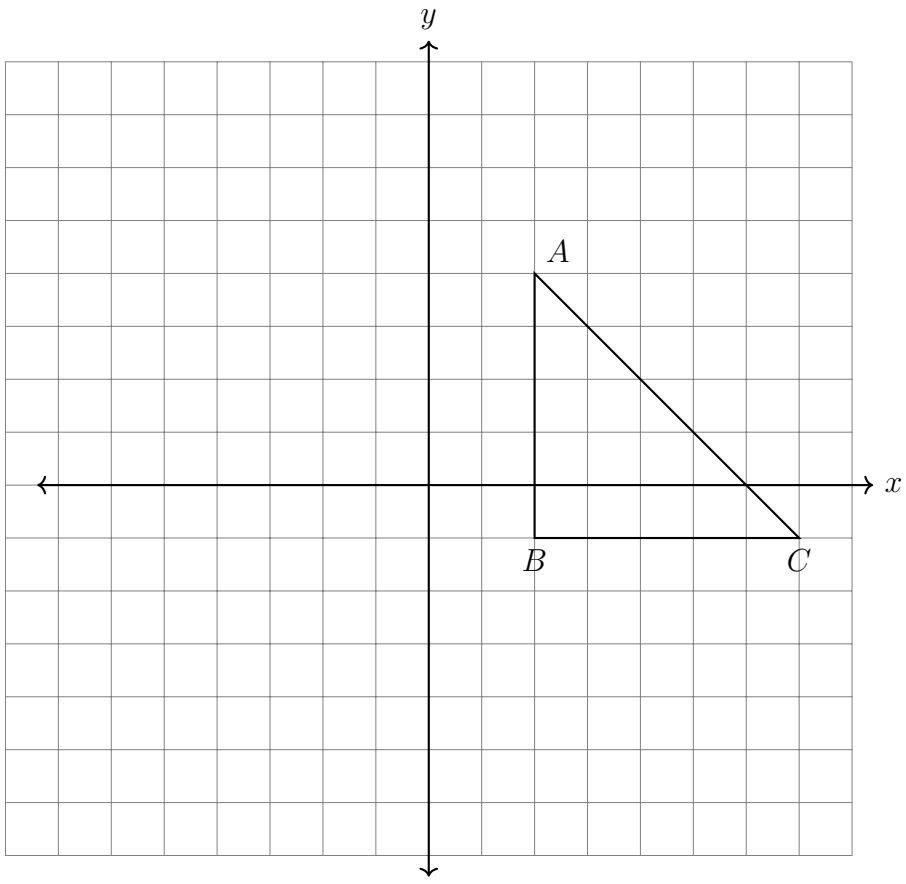
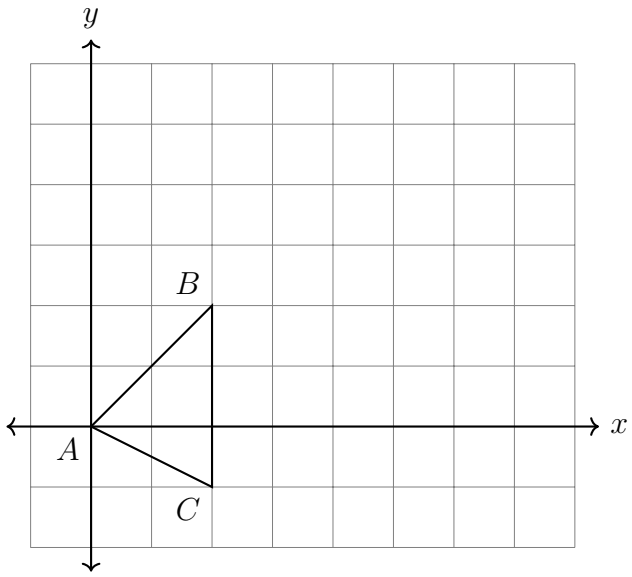
7. Apply a counter clockwise rotation of 90° centered at the origin to $\triangle ABC$. Plot and label the image on the axes below.



8. Dilate $\triangle ABC \to \triangle A'B'C'$ by a factor of $k = 2$ centered at the origin, $(x, y) \to (2x, 2y)$. Plot and label the image on the axes.



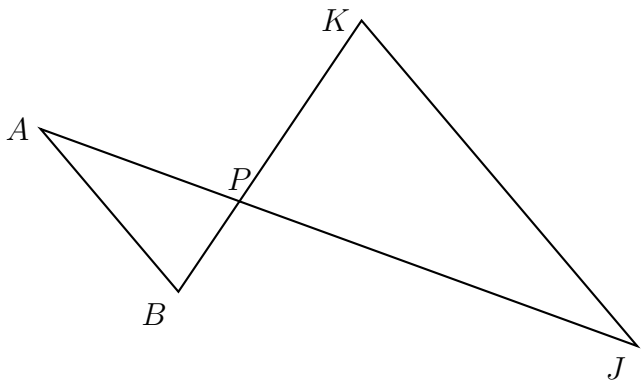
G.SRT.5 Use similarity criteria for triangles to solve problems

9. Given $\triangle ABC \sim \triangle DEF$, $m\angle A = 45°$, and $m\angle F = 110°$. Find $m\angle D$.

10. Two triangles are shown with P the intersection of $\overline{AJ}$ and $\overline{BK}$.

    (a) What theorem can be used to justify $\angle APB \cong \angle JPK$?

    (b) What angle must be congruent to $\angle J$ to prove $\triangle ABP \sim \triangle JKP$ by *angle-angle similarity*?



11. A dilation maps $\triangle ABC \to \triangle ADE$. Given $AB = 12$, $AC = 14$, $BC = 10$, $DE = 25$.

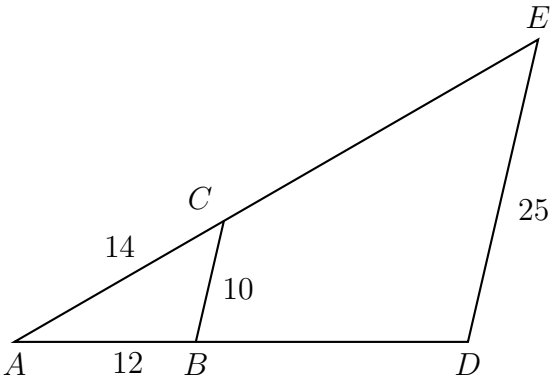
    Find the scale factor and side lengths:

    $k =$

    $AE =$

    $AD =$

    $BD =$



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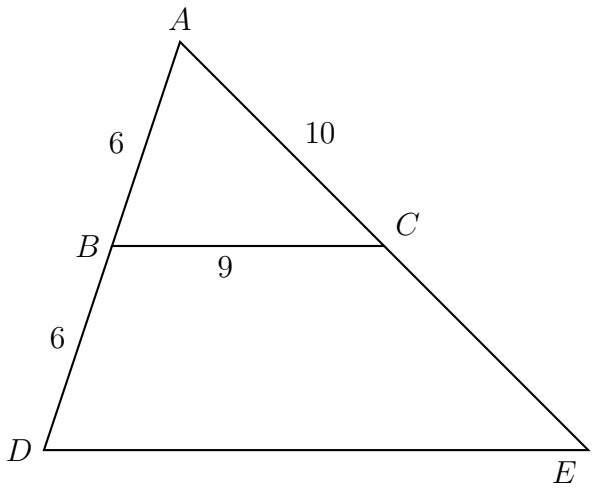
12. Triangle ADE is drawn with $\overline{BC} \parallel \overline{DE}$, as shown. Given $AB = 6$, $BC = 9$, $AC = 10$, and $BD = 6$.

    (a) Find DE.

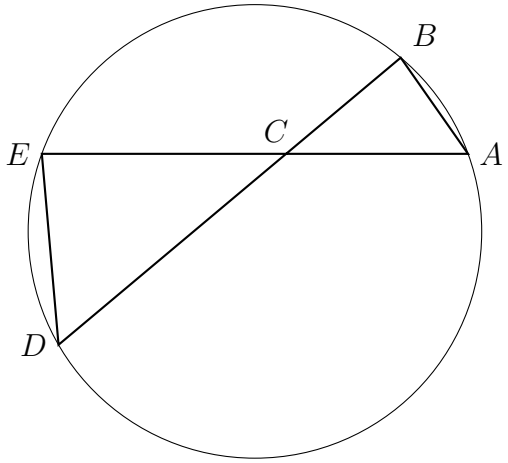
    (b) Find AE.



13. In the diagram below, the chords $\overline{AE}$ and $\overline{BD}$ intersect at C, with $\triangle ABC \sim \triangle DEC$.

    (a) $m\angle A = 70°$ and $m\angle B = 85°$.
    Find $m\angle D$.

    (b) $BC = 10$, $CD = 20$, and $CE = 15$.
    Find AC.



G.SRT.C.8 Use trigonometry to solve problems with right triangles

14. As shown, right $\triangle ABC$ has $AC = 5, BC = 12, AB = 13$, m$\angle C = 90°$.

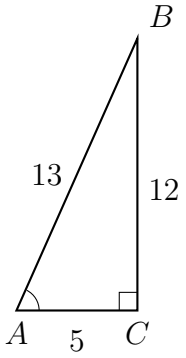
    Express each trigonometric ratio as a fraction.

    (a) $\sin A =$

    (b) $\cos A =$

    (c) $\tan A =$

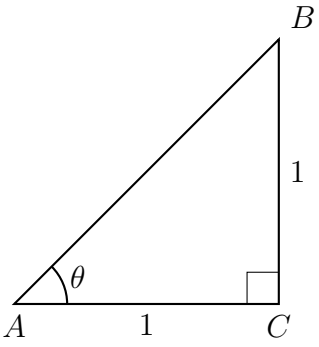
    (d) Find the angle measure of $\angle A$ rounded to the *nearest whole degree.*



15. Isosceles right $\triangle ABC$ is shown with legs $AC = BC = 1$ as marked.

    (a) Write down θ.

    (b) Find the length of hypotenuse AB as an exact expression.



16. At an angle of elevation of 15°, the top of a structure B is visible from point A on the ground 50 meters away, as shown below.

    Find the height h of the structure to the *nearest tenth of a meter.* (not to scale)