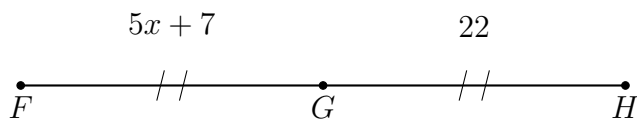


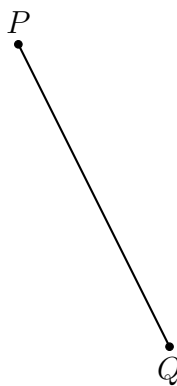
#### 4.14 Exam: Trigonometry and Cumulative Review

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

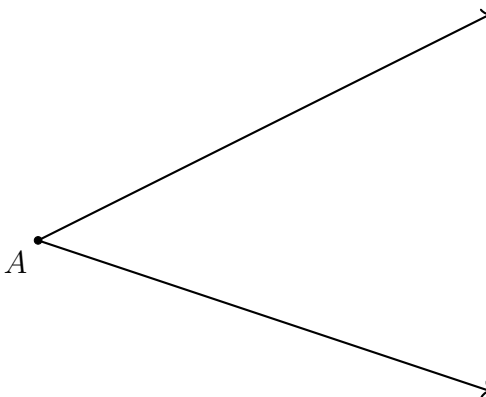


#### G.CO.12 Make and justify formal geometric constructions

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

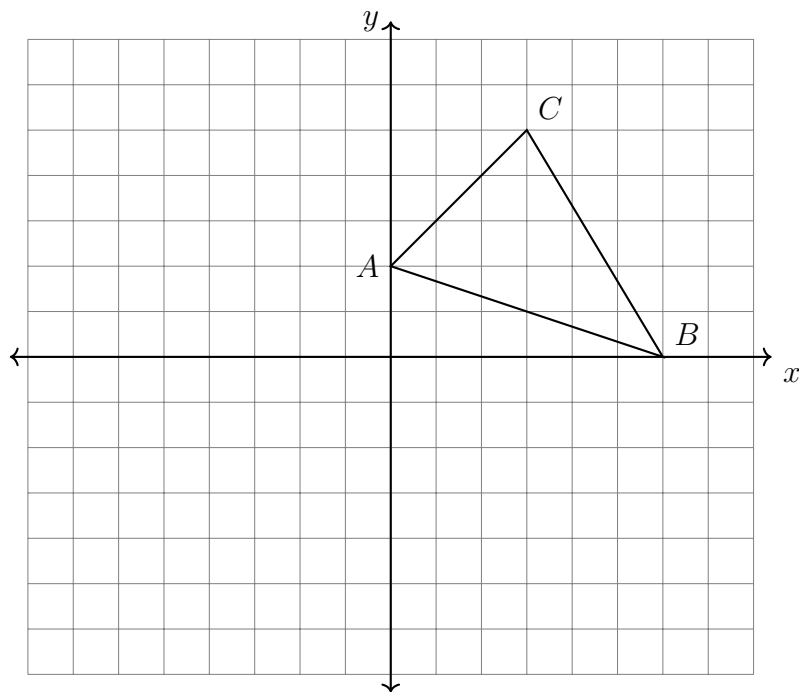


3. Construct the angle bisector of  $\angle A$ .



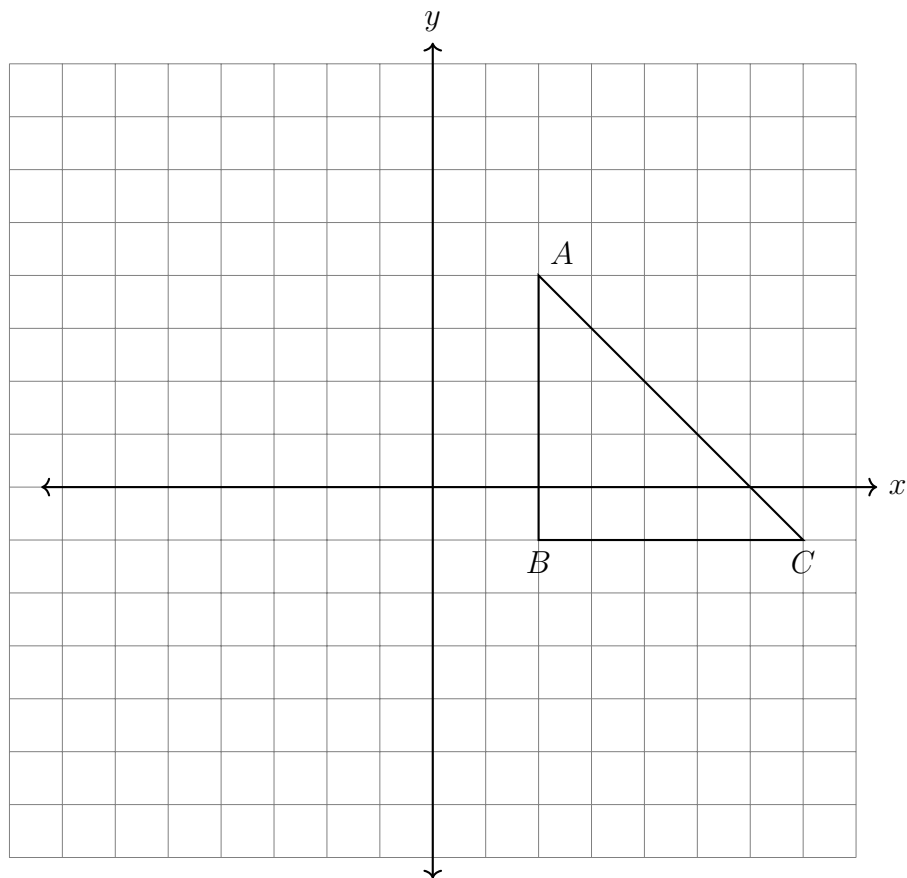
**G.CO.5 Transform a figure using translation, reflection, or rotation**

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

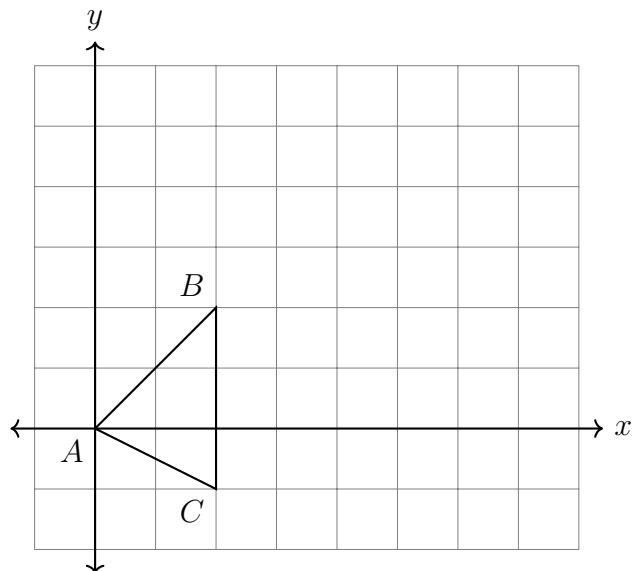


5. A translation maps  $P(2, 3) \rightarrow P'(-5, 0)$ . What is the image of  $Q(6, 2)$  under the same translation?
6. The translation mapping  $x \rightarrow x + 4$  and  $y \rightarrow y - 5$  is applied to  $\triangle ABC$ .
- (a) Write as coordinate pairs the vertices of the image,  $\triangle A'B'C'$
- $A(-1, 2) \rightarrow$
- $B(3, -2) \rightarrow$
- $C(0, 1) \rightarrow$
- (b) Which triangle is larger, or are they the same size? Justify your answer.

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



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

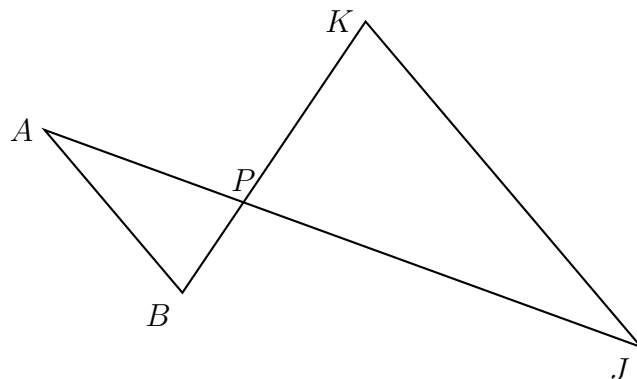


**G.SRT.5 Use similarity criteria for triangles to solve problems**

9. Given  $\triangle ABC \sim \triangle DEF$ ,  $m\angle A = 45^\circ$ , and  $m\angle F = 110^\circ$ . 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  $\triangle ABC \rightarrow \triangle ADE$ . Given  $AB = 12$ ,  $AC = 14$ ,  $BC = 10$ ,  $DE = 25$ .

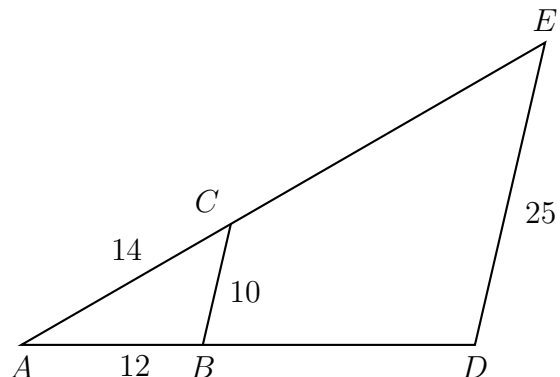
Find the scale factor and side lengths:

$$k =$$

$$AE =$$

$$AD =$$

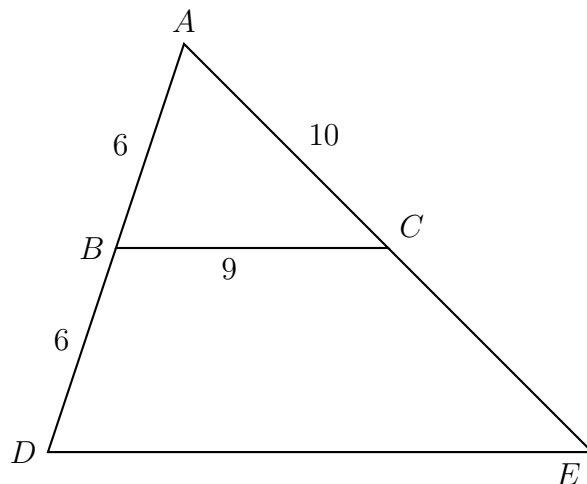
$$BD =$$



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

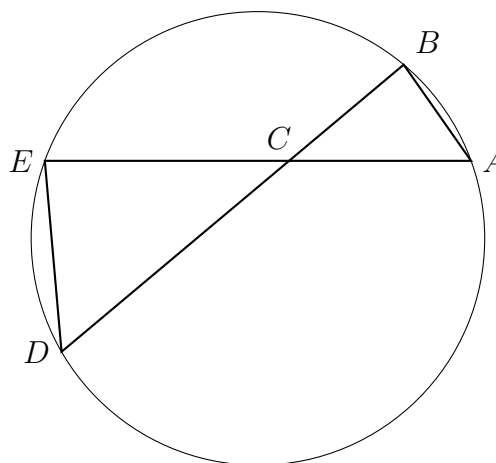
(a) Find  $DE$ .

(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)  $m\angle A = 70^\circ$  and  $m\angle B = 85^\circ$ .  
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  $AC = 5$ ,  $BC = 12$ ,  $AB = 13$ ,  $m\angle C = 90^\circ$ .

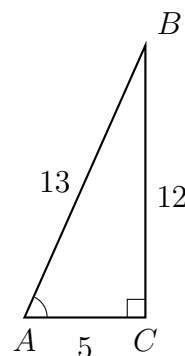
Express each trigonometric ratio as a fraction.

(a)  $\sin A =$

(b)  $\cos A =$

(c)  $\tan A =$

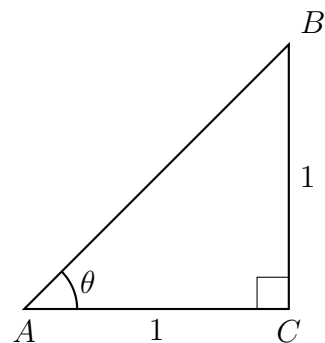
- (d) Find the angle measure of  $\angle A$  rounded to the *nearest whole degree*.



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

- (a) Write down the value of  $\theta$ .

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



16. At an angle of elevation of  $15^\circ$ , 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)

