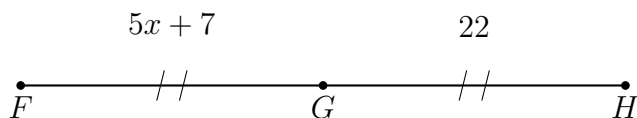
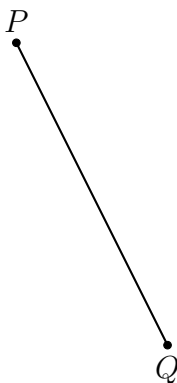


#### 4.14 Test: Trigonometry and Cumulative Review

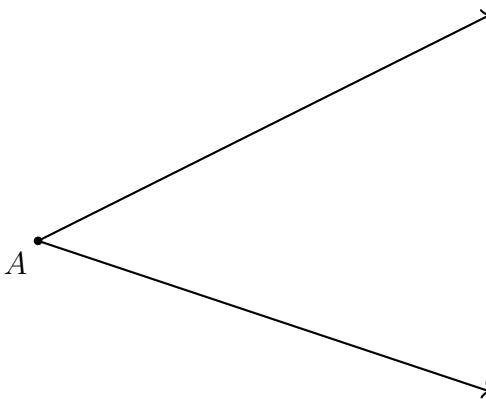
1. Point  $G$  bisects  $\overline{FH}$ , with  $FG = 5x + 7$ ,  $GH = 22$ . Find  $x$ .



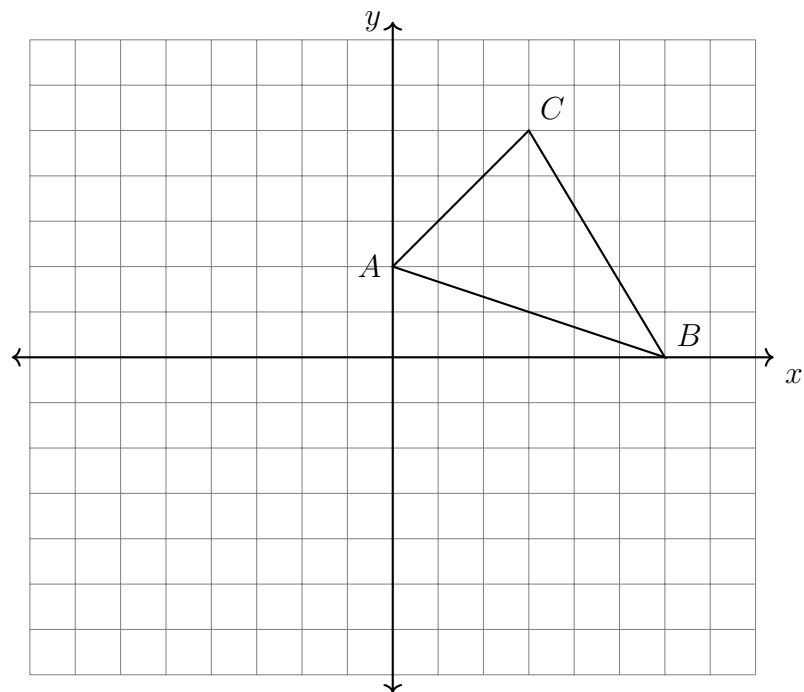
2. Construct a perpendicular bisector of  $\overline{PQ}$ .



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

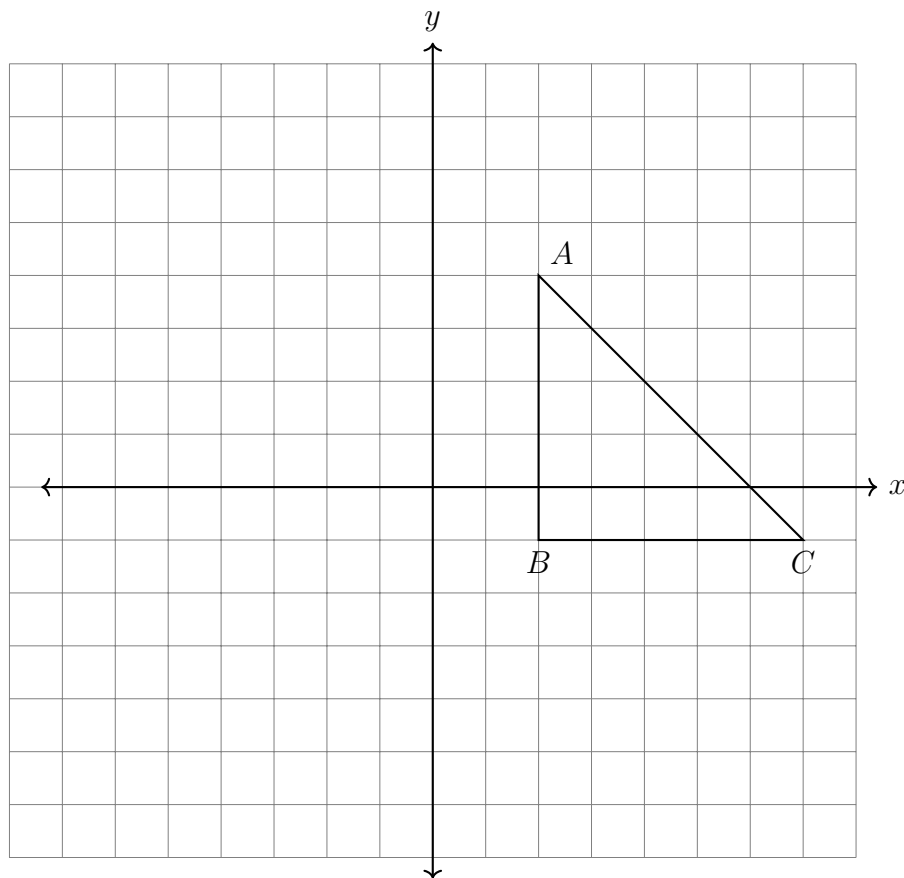


4. Reflect  $\triangle ABC$  across the  $x$ -axis. Label the image  $\triangle A'B'C'$  on the graph.

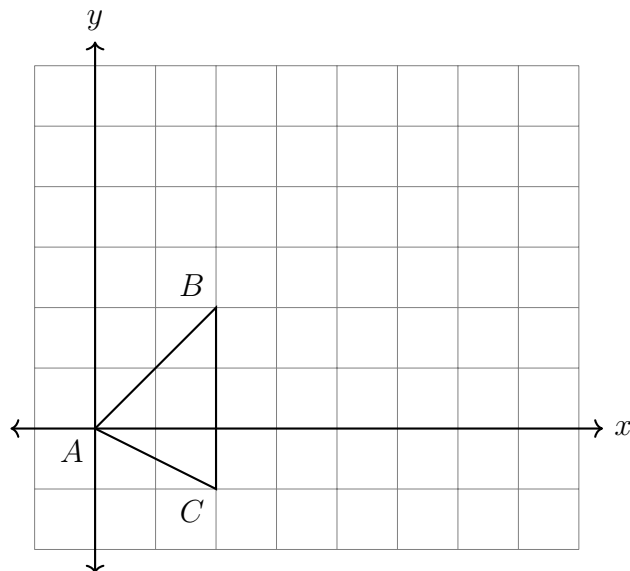


5. A translation maps  $P(2, 3) \rightarrow P'(-5, 0)$ . What is the image of  $Q(6, 2)$  under the same translation?
6. The translation mapping  $x \rightarrow x + 4$  and  $y \rightarrow y - 5$  is applied to  $\triangle ABC$ .
- (a) Write as coordinate pairs the vertices of the image,  $\triangle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

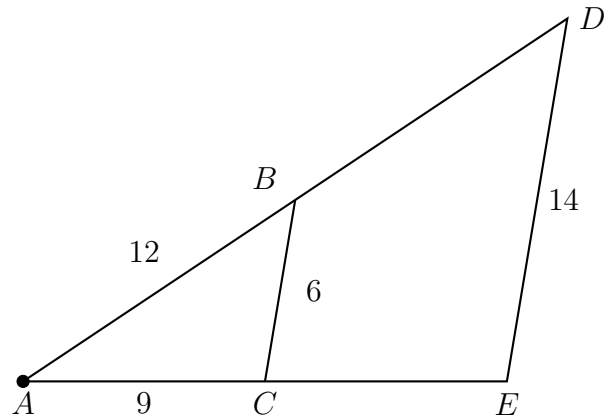


8. Dilate  $\triangle ABC \rightarrow \triangle A'B'C'$  by a factor of  $k = 2$  centered at the origin,  $(x, y) \rightarrow (2x, 2y)$ . Plot and label the image on the axes.



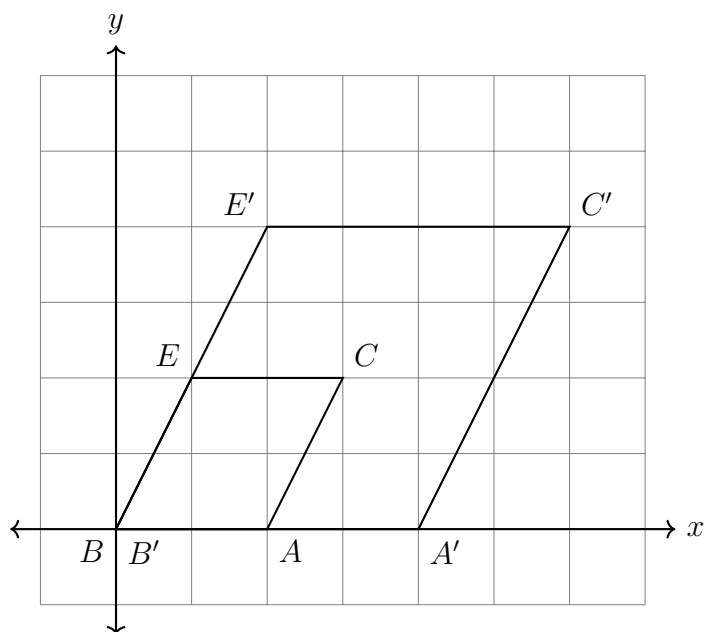
9. A dilation centered at  $A$  with scale factor  $k = 2\frac{1}{3}$  maps  $\triangle ABC \rightarrow \triangle ADE$ . Given the lengths  $AC = 9$ ,  $BC = 6$ ,  $AB = 12$ , and  $DE = 14$ .

How long are  $AD$  and  $AE$ ?



10. Given  $\triangle ABC \sim \triangle DEF$ ,  $m\angle A = 35^\circ$ , and  $m\angle F = 105^\circ$ . Find  $m\angle C$ .

11. What is the transformation mapping parallelogram  $BECA \rightarrow B'E'C'A'$ , as shown in the diagram. (hint: Dilations must specify the center and scale factor.)



12. A dilation maps  $\triangle ABC \rightarrow \triangle ADE$ . Given  $AB = 9$ ,  $AC = 11.1$ ,  $BC = 6$ ,  $DE = 14$ .

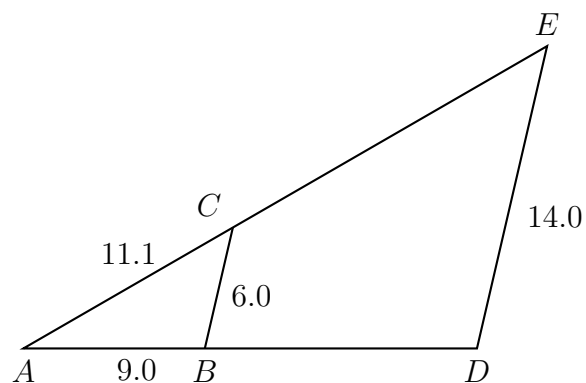
Find the scale factor and side lengths:

$$k =$$

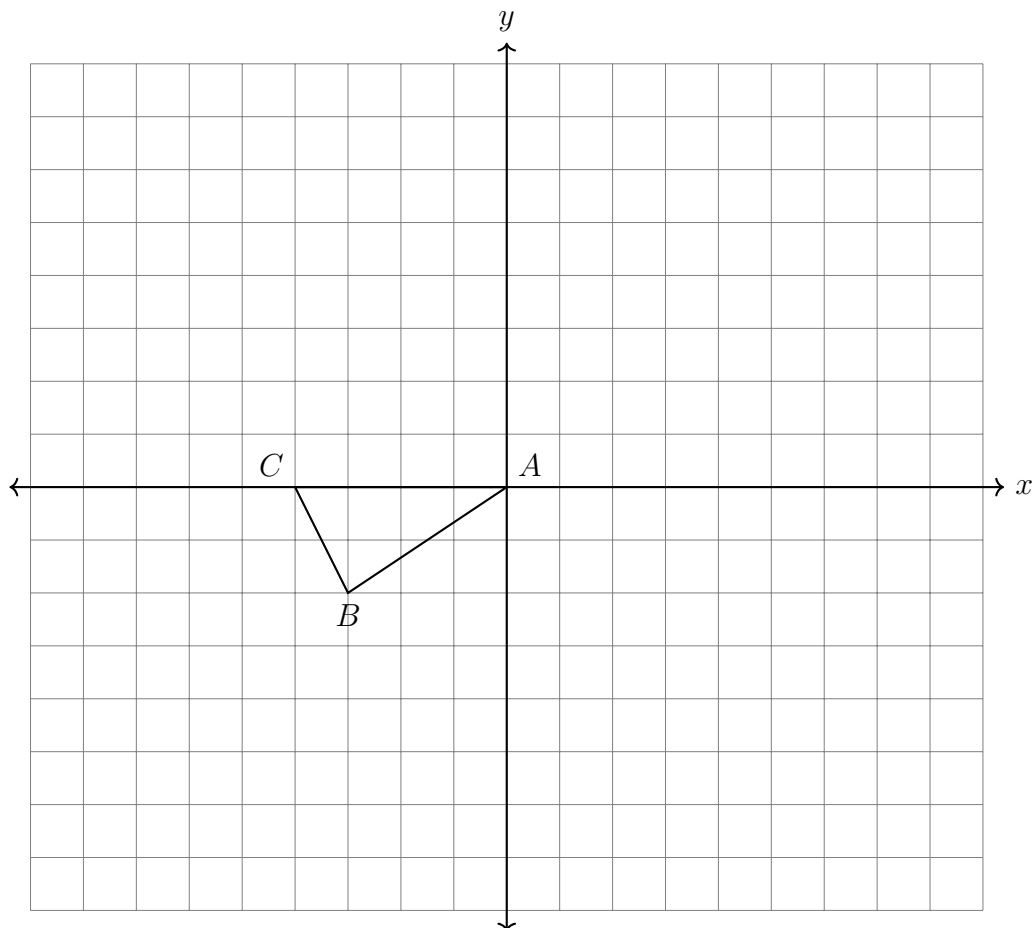
$$AD =$$

$$AE =$$

$$BD =$$



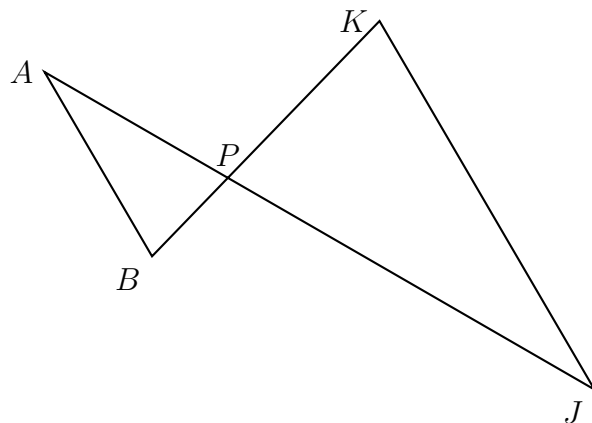
13. Reflect  $\triangle ABC$  across the  $x$ -axis. Then, dilate  $\triangle A'B'C'$  by a factor of  $k = 2$  centered at the origin to produce  $\triangle A''B''C''$ . Plot and label the two triangles in the graph below.



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

(a) Justify  $\angle APB \cong \angle JPK$ .

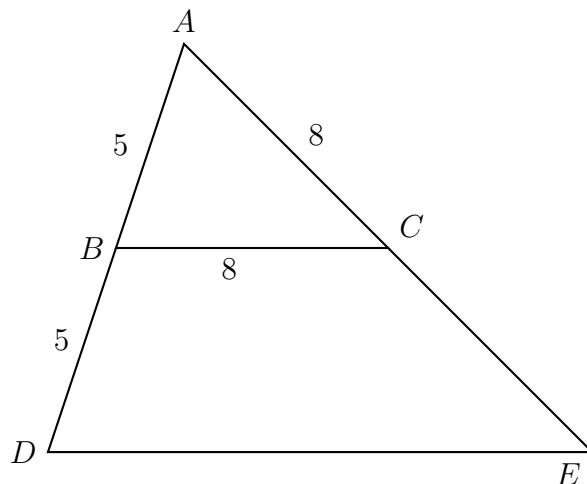
(b) What angle must be congruent to  $\angle B$  to prove  $\triangle ABP \sim \triangle JKP$  by *angle-angle similarity*?



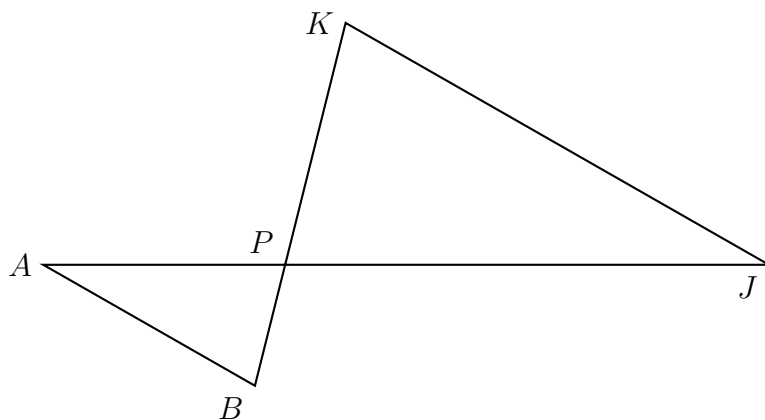
15. Triangle  $ADE$  is drawn with  $\overline{BC} \parallel \overline{DE}$ , as shown. Given  $AB = 5$ ,  $BC = 8$ ,  $AC = 8$ , and  $BD = 5$ .  $m\angle A = 72^\circ$ .

(a) Find  $DE$ .

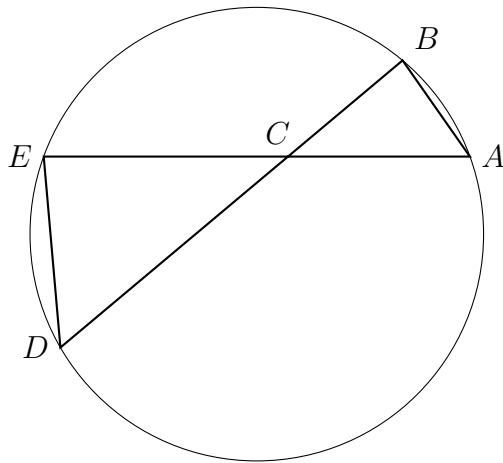
(b) Find  $m\angle ABC$  and  $m\angle E$ .



16. Given  $\triangle ABP \sim \triangle JKP$  as shown below.  $AB = 10$ ,  $AP = 9.0$ ,  $PK = 12.5$ , and  $JK = 25$ . Find  $JP$  and  $BP$ .



17. In the diagram below, the chords  $\overline{AE}$  and  $\overline{BD}$  intersect at  $C$ , with  $\triangle ABC \sim \triangle DEC$ ,  $BC = 4$ ,  $AC = 5$ , and  $BD = 11.5$ . Determine the length of  $\overline{CE}$ .



18. In the diagram below  $\triangle ABC \sim \triangle DEF$ ,  $DE = x+4$ ,  $AB = 12$ ,  $AC = 21$ ,  $DF = 2x+4$ . Solve for  $x$ .

