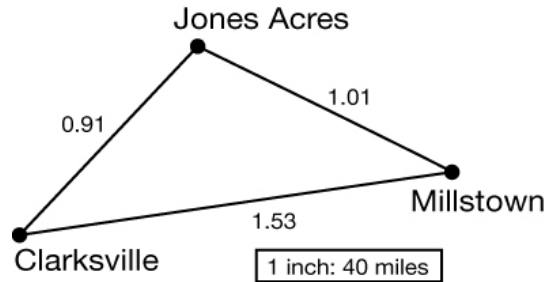


**Maps**

Maps are scale drawings of actual places and the distances among them. The key to a map gives the ratio between actual and map distances.

1. This diagram shows three towns, their locations with respect to each other, and the distances between them on a map.



- a. Explain why the triangle formed by the actual towns is similar to the one shown.

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- b. Explain how to find the actual distances between the towns.

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- c. Find the three distances between the actual towns. Show your work.

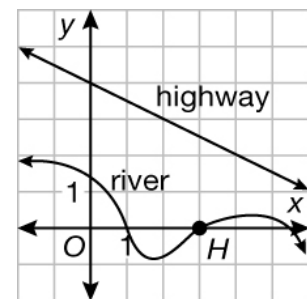
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2. This diagram shows the work of surveyors who are preparing a new map. The highway is modeled by the equation

$$y = -\frac{1}{2}x + 4.$$

- a. Find an equation for the line through  $H$  and perpendicular to the highway. Show your work.



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- b. Find the shortest distance between  $H$  and the highway. Show your work.

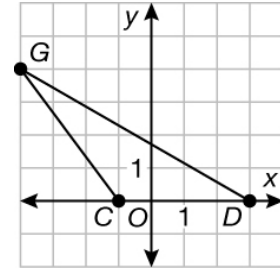
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- c. The map will use the scale 1 block length : 25 miles. What is the actual shortest distance between  $H$  and the highway?

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3. This diagram shows a map with locations  $G$ ,  $C$ , and  $D$ .



a. Make a conjecture about the type of triangle formed by  $G$ ,  $C$ , and  $D$ . Give a common sense justification based on appearance.

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b. Prove that your conjecture is true.

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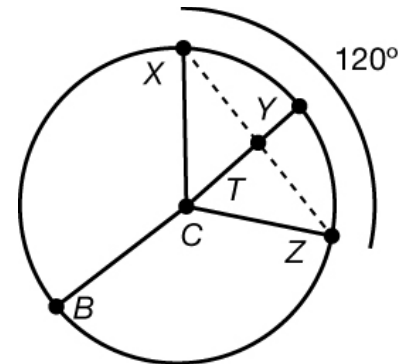
c. Identify the type of triangle formed by the actual locations of  $G$ ,  $C$ , and  $D$ . Justify your response.

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4. A radio-station owner drew this diagram using a map to show the circular region in which people can receive the broadcast signal. Point  $C$  marks the location of the broadcast tower. The map radius of the circle is 5 inches. The length of  $\overline{CT}$  is 3 inches. Point  $Y$  is the midpoint of  $\widehat{XZ}$ .



a. Explain why  $\triangle CXT$  and  $\triangle CZT$  are congruent.

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b. The map scale is 1 in : 20 miles. How many miles apart are  $X$  and  $Z$  (straight-line distance)? Show your work.

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c. To the nearest whole number, approximate the area of the actual sector  $XCZ$ . Show your work.

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