Lessons 1.1–1.3
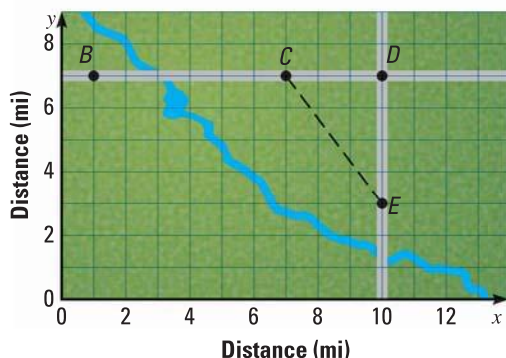
**1. MULTI-STEP PROBLEM** The diagram shows existing roads ($\overleftrightarrow{BD}$ and $\overleftrightarrow{DE}$) and a new road ($\overline{CE}$) under construction.
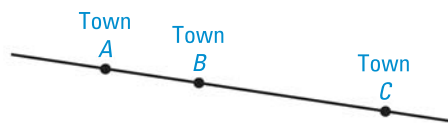

Distance (mi)

a. If you drive from point B to point E on existing roads, how far do you travel?

b. If you use the new road as you drive from B to E, about how far do you travel? Round to the nearest tenth of a mile if necessary.

c. About how much shorter is the trip from B to E if you use the new road?

2. GRIDDED ANSWER Point M is the midpoint of $\overline{PQ}$. If $PM = 23x + 5$ and $MQ = 25x - 4$, find the length of $\overline{PQ}$.

3. GRIDDED ANSWER You are hiking on a trail that lies along a straight railroad track. The total length of the trail is 5.4 kilometers. You have been hiking for 45 minutes at an average speed of 2.4 kilometers per hour. How much farther (in kilometers) do you need to hike to reach the end of the trail?

4. SHORT RESPONSE The diagram below shows the frame for a wall. $\overline{FH}$ represents a vertical board, and $\overline{EG}$ represents a brace. If $FG = 143$ cm, does the brace bisect $\overline{FH}$? If not, how long should $\overline{FG}$ be so that the brace does bisect $\overline{FH}$? *Explain.*
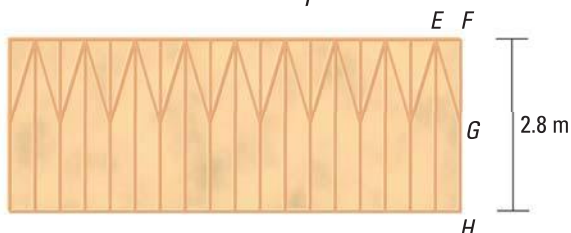
5. SHORT RESPONSE Point E is the midpoint of $\overline{AB}$ and the midpoint of $\overline{CD}$. The endpoints of $\overline{AB}$ are $A(-4, 5)$ and $B(6, -5)$. The coordinates of point C are $(2, 8)$. Find the coordinates of point D. *Explain* how you got your answer.

6. OPEN-ENDED The distance around a figure is its *perimeter*. Choose four points in a coordinate plane that can be connected to form a rectangle with a perimeter of 16 units. Then choose four other points and draw a different rectangle that has a perimeter of 16 units. Show how you determined that each rectangle has a perimeter of 16 units.

7. SHORT RESPONSE Use the diagram of a box. What are all the names that can be used to describe the plane that contains points B, F, and C? Name the intersection of planes ABC and BFE. *Explain.*
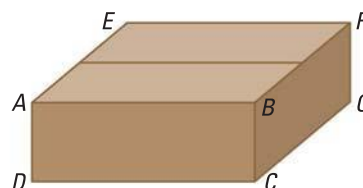
8. EXTENDED RESPONSE Jill is a salesperson who needs to visit towns A, B, and C. On the map below, $AB = 18.7$ km and $BC = 2AB$. Assume Jill travels along the road shown.

a. Find the distance Jill travels if she starts at Town A, visits Towns B and C, and then returns to Town A.

b. About how much time does Jill spend driving if her average driving speed is 70 kilometers per hour?

c. Jill needs to spend 2.5 hours in each town. Can she visit all three towns and return to Town A in an 8 hour workday? *Explain.*