Hikers

Name:

Edna leaves a trailhead at dawn to hike toward a lake 12 miles away, where her friend Maria has been camping. At the same time, Maria leaves the lake to hike toward the trailhead (on the same trail, but in the opposite direction).

Edna is walking uphill, so her average speed is 1.5 mi/h. Maria is walking downhill, so her average speed is 2 mi/h.

In this activity you'll investigate when and where the hikers will meet.

EXPLORE

1. Complete the table.

Time (hours)	Edna's Distance (miles from trailhead)	Maria's Distance (miles from trailhead)
0	0	12
1		
2		
3		
4		
5		

2. Open **Hikers.gsp** and go to page "Table." Double-click each value and change it to match the value in the table above. From the table, what can you predict about when the hikers will meet?

To predict the meeting time more accurately, you'll graph the points in the table, and then graph lines through them.

3. To graph Maria's first point, select the 0 in the Time column, then the 12 in Maria's Distance column, and choose **Graph│Plot as (x, y).** Axes and a grid will appear, with the point (0, 12) plotted. Repeat this process to plot all of Edna's and Maria's distances in the table. What patterns do you see?

4. Construct point *T* on the *x*-axis. While it's selected, choose **Measure│Abscissa (x)** and then choose **Edit│Properties**. Change the label to *Time.*

5. Change the label of the point on the axis to *T* and the label of the abscissa measurement to *Time.*

6. Choose **Number│Calculate** and use the Calculator to enter an expression for each hiker's distance from the trailhead. To enter *Time* into the Calculator, click the value in the sketch. What expressions did you use?

   Edna:

   Maria:

7. Select *Time* and your value for Edna's distance from step 6. Choose **Graph│Plot as (x, y)** and then choose **Display│Trace Plotted Point.** Drag point *T* and describe what you see.

8. Repeat step 7 using *Time* and your value for Maria's distance. When will the two hikers meet?

9. Choose **Display│Erase Traces.** Choose **Graph│Plot New Function** and enter an expression for each hiker's distance from the trailhead after *x* hours. Color each graph with the same color as the column it represents.

10. Construct a point on Maria's graph. While it's selected, choose **Measure│Coordinates.** Drag this point to predict when and where the hikers will meet. What are coordinates of that point? What does each coordinate represent?

11. Use the expressions you graphed to write a single equation. Solve the equation for the time when they meet, and then find the distance from the trailhead. Show your work.

12. Convert your time solution to hours and minutes.

EXPLORE MORE

13. You've made predictions by a table, by a graph, and by solving an equation. What other ways can you use to predict when the two hikers will meet?