Name _____ Class _____ Date _____

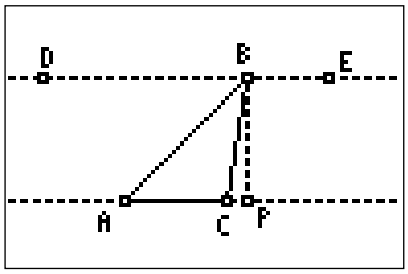
Area of a Triangle

For Use With Lesson 7-1

FILES NEEDED: Cabri® Jr.
AppVars: GL71A, GL71B

Given: In GL71A, $\overleftrightarrow{DE} \parallel \overleftrightarrow{AC}$ and $\overline{BP} \perp \overleftrightarrow{AC}$. $\triangle ABC$ has base length AC and height BP.

Explore: area of $\triangle ABC$

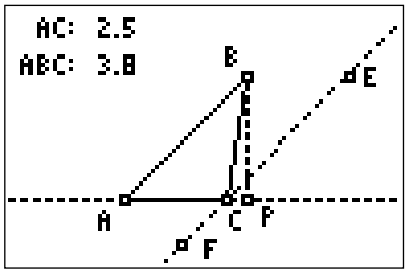


1. Install the screen measures BP and area of $\triangle ABC$. Predict what will happen to each screen measure as you drag point B along $\overleftrightarrow{DE}$.

2. Justify each prediction. Then test your predictions by dragging B along $\overleftrightarrow{DE}$.

Before doing Question 2, save your GL71A from Question 1 as PIC1.

In GL71B at the right, $\triangle ABC$ is the same triangle as the one shown above. In this case, however, $\overleftrightarrow{EF} \parallel \overline{AB}$.



3. Predict what will happen to the screen measures AC and area of $\triangle ABC$ as you drag C along $\overleftrightarrow{EF}$.

4. Justify each prediction. Then test your predictions by dragging C along $\overleftrightarrow{EF}$.

5. For each of three locations of C, predict the value of BP. Then test your predictions by installing the screen measure BP. If your predictions are correct, explain why.

Extension

Recall the screen that you saved as PIC1. Replace the screen measures for BP with the measures for AB and BC. Also, install the screen measure for the perimeter of $\triangle ABC$. Note that you now have four measures on the screen.

6. Drag point B along $\overleftrightarrow{DE}$. Describe $\triangle ABC$ for large values of the perimeter and for small values of the perimeter.

7. Drag B to find the smallest value of the perimeter. What type of triangle does $\triangle ABC$ appear to be? Give a convincing argument why $\triangle ABC$ must be this type of triangle.

Area of a Triangle

Activity Objective

Students use Cabri® Jr. to explore the relationship between the base and height and the area of a triangle.

Correlation to Text

- Lesson 7-1: Areas of Parallelograms and Triangles

Time

- 15–20 minutes

Materials/Software

- App: Cabri® Jr.
- AppVars: GL71A, GL71B
- Activity worksheet

Skills Needed

- drag an object
- install a measure

Classroom Management

- Use TI Connect™ software, TI-GRAPH LINK™ software, the TI-Navigator™ system, or unit-to-unit links to transfer GL71A and GL71B to each calculator.

Notes

- Students should notice that the initial area of $\triangle ABC$ is the same in GL71A and GL71B.

Answers

1. The height and the area will not change.
2. $\overleftrightarrow{DE}$ and $\overleftrightarrow{AC}$ are parallel, so BP will not change. The area does not change because it depends on base and height, which do not change.
3. AC will change. The area will stay the same.
4. AC increases as C moves away from A toward E. AC decreases as C moves closer to A in the direction of F. Area stays the same because 1) base $\overline{AB}$ does not change and 2) the height to $\overline{AB}$ stays the same as parallel lines remain a constant distance apart.
5. Check students' work. $BP = \frac{2 \cdot \text{Area } \triangle ABC}{AC}$ (both numerator and denominator shown on screen).
6. $\triangle ABC$ is obtuse for large perimeters and acute for small perimeters.
7. Isosceles; Answers may vary. Sample: For every non-isosceles triangle, there is a second triangle congruent to it. These two triangles determine two locations of B. The triangle for each location of B between these two points has a smaller perimeter. Thus the smallest perimeter must occur where $BA = BC$.