Name _____

Date _____

EXPLORATIONS

Activity 13

Similar Figures

Construct the geometric object by following the instructions below, and then answer the questions about the object.

1. Create two similar triangles (same shape but different sizes).

- **a.** From the Display Toolbox, select **Numerical Edit**.
- **b.** Move the arrow to the top left side of the screen. Click once. Type the number 0.5.
- **c.** Construct and label $\triangle ABC$.
- **d.** From the Transform Toolbox, select **Dilation**.
- **e.** Move the pencil to $\triangle ABC$ until the message ***Dilate this triangle*** appears. Click once.
- **f.** Move the pencil to the far left. Click once and label this X.
- **g.** Move the pencil to the number until the message ***Using this factor*** appears. Click once. A new triangle appears that is similar to the original.
- **h.** Label the new triangle so that $\triangle ABC \sim \triangle DEF$. (Refer to Figures 13.1 and 13.2.)

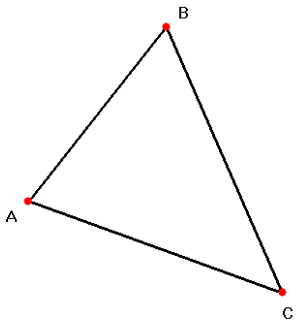

Figure 13.1

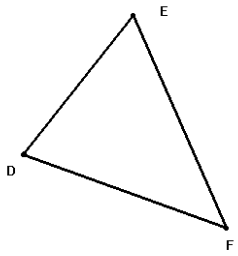

Figure 13.2

- **i.** Drag point X (if necessary) so that the triangles do not overlap.

2. Create a table.
   a. From the Measures Toolbox, select **Tabulate**.
   b. Create a table that is five rows wide and nine columns long.
3. Measure and label the length of each side of the two triangles.
4. Calculate the ratio of $\overline{AB}$ to $\overline{DE}$.
   a. From the Measure Toolbar, select **Calculate**.
   b. Click on numeric value of $\overline{AB}$.
   c. Click on ÷.
   d. Click on numeric value of $\overline{DE}$.
   e. Double-click on =. Drag to the screen and click.
5. Place the lengths of the sides and the ratio in a table.
   a. From the Measures Toolbox, select **Tabulate**.
   b. Move the pencil to $\overline{AB}$ and click once.
   c. Move the pencil to the corresponding side's measurement. Click once.
   d. Move the pencil to the result. Click once.
6. Calculate the ratio $\overline{BC}/\overline{EF}$.
7. Place the lengths of the sides and the ratio in the table.
8. Calculate the ratio $\overline{AC}/\overline{DF}$.
9. Place the lengths of the sides and the ratio in the table.
10. What did you notice about all the ratios?

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11. Alter the triangle to check different ratios.
    a. From the Display Toolbox, select **Numerical Edit** and move to the original number (0.5) until the message ***This number*** appears. Click once.
    b. Change the number to 0.3333.
    c. From the Measures Toolbox, select **Tabulate**. Move the pencil to any number or length. Click once. (A new set of results will appear in the table.)
12. What do you notice about the ratios now that the lengths have changed?

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13. Alter triangles again.
    a. From the Pointer Toolbox, select **Pointer**, move the pointer to point A and drag point A so that the lengths in $\triangle ABC$ change.
    b. From the Measures Toolbox, select **Tabulate** and move the pencil to any number or length. Click once. (A new set of results will appear in the table.)

14. What do you notice about the ratios now that the lengths have changed?

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15. Alter the triangle using either the numerical edit or the pointer. Check the results and place them in the table.

16. What can you conclude about ratios of corresponding sides of similar triangles?

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17. Find the perimeter of each triangle.

a. From the Measure Toolbar, select **Distance and Length.**

b. Move the pointer to $\triangle ABC$ until the message ***Perimeter of this triangle*** appears. Click once. Label this perimeter of $\triangle ABC$.

c. Move the pointer to $\triangle DEF$ and repeat.

18. Calculate the ratio of the perimeters.

19. How does the ratio of the perimeters compare to the ratios of the sides?

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20. Alter the triangle several times to verify the results.

21. What can you conclude about the ratio of the perimeters of two similar triangles?

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22. Clear the table.

23. Measure and label the corresponding angles in $\triangle ABC$ and $\triangle DEF$.

24. What do you notice about the corresponding angles?

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25. Alter the triangle using the numerical edit or the pointer. Now compare the angles. Did the result change?

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26. What can you conclude about the corresponding angles of similar triangles?

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27. Do you think the results would be the same if the polygon had more than three sides? (A pentagon, for example.)

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