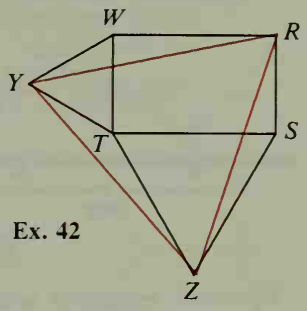
C **40.** **a.** Suppose that two sides of a quadrilateral are parallel and that one diagonal bisects an angle. Does that quadrilateral have to be special in other ways? If so, write a proof. If not, draw a convincing diagram.

b. Repeat part (a) with these conditions: Suppose that two sides are parallel and that one diagonal bisects two angles of the quadrilateral.

41. Draw a regular pentagon $ABCDE$. Let X be the intersection of $\overline{AC}$ and $\overline{BD}$. What special kind of quadrilateral is $AXDE$? Write a paragraph proof.

42. Given: Rectangle $RSTW$;
equilateral $\triangle YWT$ and STZ
What is true of $\triangle RYZ$?
Write a paragraph proof.



Ex. 42

Explorations

These exploratory exercises can be done using a computer with a program that draws and measures geometric figures.

As you will learn in the next section, a *trapezoid* is a quadrilateral with exactly one pair of parallel sides.

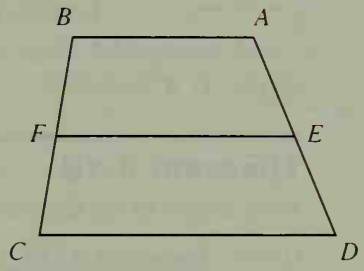
Draw trapezoid $ABCD$ with $\overline{BA} \parallel \overline{CD}$. Label the midpoints of $\overline{AD}$ and $\overline{BC}$ as E and F respectively, and draw $\overline{FE}$.

Measure $\angle BFE$ and $\angle BCD$. What is true of $\overline{CD}$ and $\overline{FE}$? What postulate or theorem tells you this?

What is true of $\overline{FE}$ and $\overline{BA}$? Why?

Measure the lengths of $\overline{BA}$, $\overline{CD}$, and $\overline{FE}$. What do you notice?

Write an equation that relates BA, CD, and FE. Repeat the drawing and measurements until you are sure of your equation.



Mixed Review Exercises

Find the average of the given numbers. (The *average* is the sum of the numbers divided by the number of numbers.)

1. 17, 9 **2.** 15, 25 **3.** 18, 2, 13 **4.** 7, 8, 5, 15, 10

5. 7.9, 8.5 **6.** 4, −7 **7.** −3, 4, −7, 10 **8.** 1.7, 2.6, 9.1, 0.4

9. The numbers given are the coordinates of the endpoints of a segment on a number line. Find the coordinate of the midpoint by taking the average.

a. 12, 34 **b.** −3, 7 **c.** 17, −9 **d.** −5, −7