Problem

For each part, identify a possible shape that satisfies all of the clues in the part.

A) I have six lines of symmetry. All of my angles are larger than a right angle. I have six sides and six vertices. What shape am I?

B) I have two sets of parallel sides. I have two angles that are larger than a right angle and two angles that are smaller than a right angle. I am a quadrilateral. What shape am I?

C) I have four vertices. I have one line of symmetry and one set of parallel sides. I have four angles, two are larger than a right angle and two are smaller than a right angle. What shape am I?

D) I have three vertices and three angles. All of my angles are smaller than a right angle. I have three lines of symmetry. What shape am I?

E) I have four angles, four sides and four vertices. I have two sets of parallel sides and four right angles. I have four lines of symmetry. What shape am I?

Solution

A) A regular hexagon

B) A parallelogram or a rhombus

(note that a rhombus is a special case of a parallelogram)
C) An isosceles trapezoid (i.e. a trapezoid where the two non-parallel sides are the same length)

D) An equilateral triangle

E) A square
Teacher’s Notes

By definition, a line of symmetry divides a single shape into two identical halves. Two shapes that are identical are said to be congruent. For example, suppose we label the isosceles trapezoid as follows:

![Diagram of isosceles trapezoid with line of symmetry]

and we know that EF is a line of symmetry. This means that the quadrilateral AEFD is congruent to the quadrilateral BEFC. The symbol for congruence is \(\cong\).

So we can state:

\[ \text{AEFD} \cong \text{BEFC} \]

If two geometric figures are congruent, that means that all corresponding side lengths and interior angles are equal. In this case, we know that the length of AE is equal to the length of BE. We also know that the size of \(\angle ADF\) is equal to the size of \(\angle BCF\). These are just two of several conclusions we can draw, knowing that these figures are congruent.

Identifying congruent figures can be very helpful when working on proofs in geometry.