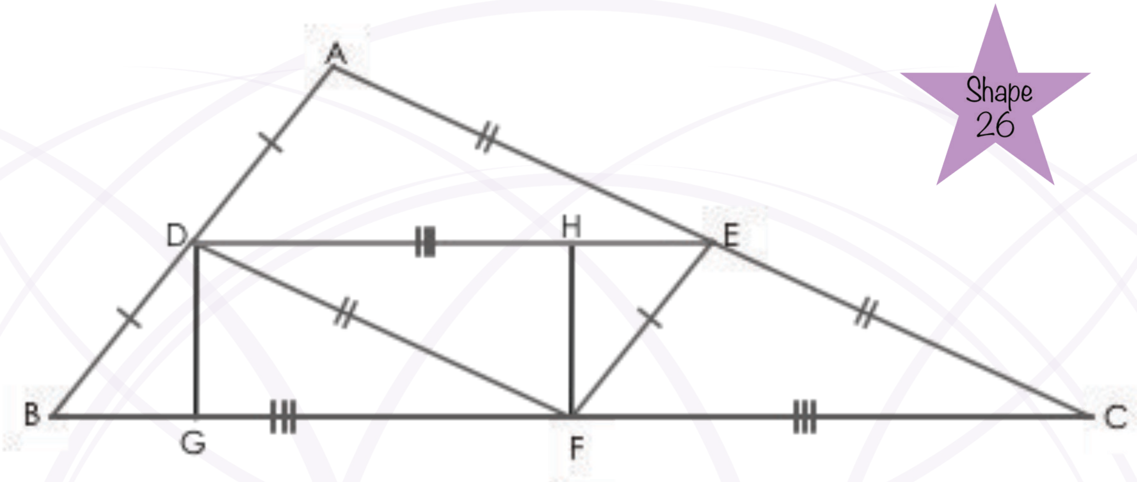
Exploring Theorems

The Midpoint Theorem



Shape 26

By tessellating with the scalene triangle, we can prove the **Midpoint Theorem** by using the parallelogram DEFB on the inside.

Examine ∆ ABC:
(Note that a unit triangle is one of the four tessellated triangles.)

- Measure AB, BC and AC
- Measure the vertices of the unit triangle with the protractor on the V2.
- Measure angles B, C and A with the protractor on the V2.

Conclusions:

1. The large triangle's sides are exactly DOUBLE those of a unit-triangle.
2. The unit-triangle's angles measures exactly the same magnitude as triangle ABC (large triangle.)
3. DE is exactly half of BC.

Their similarity enables proportionality or ratios to come into effect. This is clearly seen by the ratio of the sides:

∆ DA = ½ of AB
∆ DE = ½ of BC
∆ AE = ½ of AC

This concludes that if a line is drawn from the midpoint of one side of a triangle (DE) to the midpoint of a second side of the triangle and it is parallel to the third side, then the line will be HALF of the THIRD side.
This theorem is usually done with an exterior-drawn parallelogram and congruent triangles to complete the proof.
This is a simplified version.
See our series of Teacher's Manuals for other ways to proof this theorem.

Have the students enlarge the unit triangle. Draw a non-parallel line DE and repeat the exercise.
They can now see that the theorem will not work.
Let them the discuss the reasons why.