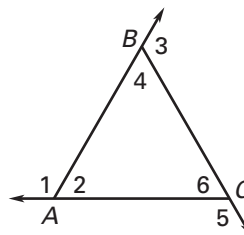


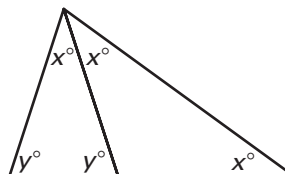
Challenge: Skills and Applications

For use with pages 194–201

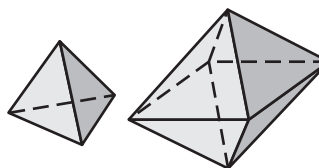
1. a. Find $m\angle 1 + m\angle 2 + m\angle 3 + m\angle 4 + m\angle 5 + m\angle 6$.
- b. Find the sum of the measures of the exterior angles of the triangle.
- c. Prove your result in part (b).



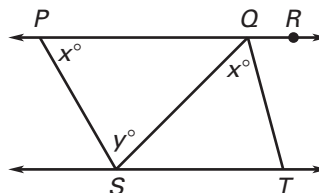
2. Use the diagram to find the values of x and y .



3. A *polyhedron* is a solid figure whose exterior surface is made up of polygons; each of these polygons is called a *face* of the polyhedron. The *defect* of a polyhedron is $(360n - S)^\circ$, where n is the number of vertices and S is the sum of all of the angle measures in all of the faces. In this exercise, we will consider only those polyhedra whose faces are triangles.



- a. Find the defects of the two polyhedra shown.
 - b. A *regular icosahedron* is a polyhedron with 20 faces that are equiangular triangles and with 12 vertices. What is the defect of a regular icosahedron?
 - c. Make a conjecture about the defect of a polyhedron whose faces are all equiangular triangles.
 - d. Do you think your conjecture is true for any polyhedron with triangular faces, even if the triangles are not equiangular? Explain.
4. a. Find $m\angle RQT$ in terms of x and/or y .
 - b. What assumption would you need to make in order to find $m\angle QST$ in terms of x and/or y ? Under this assumption, what is $m\angle QST$?



5. a. Suppose the ratio of the angle measures of a triangle is 2:3:4. Find the measure of each angle.
- b. Suppose the ratio of the angle measures of a triangle is $a:b:c$, where a , b , and c are positive numbers. Find the measure of each angle in terms of a , b , and c .