Activity 8
Figuring Areas

Sample Answers to Instructions

7. base length = 1.78 cm; altitude length = 1.23 cm; radius length = 1.51 cm

8. area of triangle abc = 1.09 cm^2

9. number of triangles = 5

10. area of pentagon = 5.46 cm^2

11. In the formula $A = ½aP$, the apothem, a, corresponds to height, H, in the formula $A = (½BH)(n)$. The perimeter, P, corresponds to (Bn), the base length times the number of triangles (or sides).

    perimeter of pentagon = 8.90 cm.

12. area of pentagon = 5.46 cm^2
    This area value is exactly equal to the value found in step 10.

13. area of pentagon = 5.46 cm^2
    This area value is exactly equal to the areas calculated in step 10 and step 12.

Activity 8
Figuring Areas
(Continued)

Sample Answers to Instructions

14.

regular polygon	perimeter (cm)	area (cm^2)
triangle	7.87	2.98
pentagon	8.9	5.46
octagon	9.28	6.49
dodecagon	9.41	6.88
17-gon	9.46	7.05

Note: *A dodecagon has 12 sides and 12 angles.*

15. As the number of sides of the regular polygon increases, the figure approaches a circle.

16. circumference of the circle = 9.52 cm

    As the number of sides of the regular polygon increases, the perimeter values approach the circumference of the circle.

17. area of the circle = 7.21 cm^2

    As the number of sides of the regular polygon increases, the area values approach the area of the circle.

Answers to Questions

1. The total polygon area increases because the areas of more triangles are being added.
2. The formula $A = \frac{1}{2}aP$ cannot be used for non-regular polygons since the apothem lengths could vary.
3. To compare the areas and perimeters of regular polygons to the area and circumference of a circle, the vertices of the polygons must lie along the circumference of the circle. Therefore, the radius measures of all the figures must be constant.
4. Because the area value of the circle is computed by a squaring operation, differences in the area values between the 17-gon and circle are magnified.