Motivational Problems on Area

1. Given a regular octagon made up of isosceles triangles of area 10, how would you fine the area of the whole octagon? What is the central angle of one of the isosceles triangles?

2. A trapezoid has two 65-degree angles and 8-inch and 12-inch parallel sides. How long are the non-parallel sides? What is the area enclosed by this figure?

3. Find the area of a regular octagon with a side that has length 10 cm.

4. The area of a rhombus is 100. Find the length of the two diagonals if one is twice as long as the other one.

5. The area of an equilateral triangle is $100\sqrt{3}$ square inches. How long are its sides?

6. The area of triangle DCA is 13.2. If AB=10.2 and AC=3.6, find the area of the unshaded portion of triangle ABD.
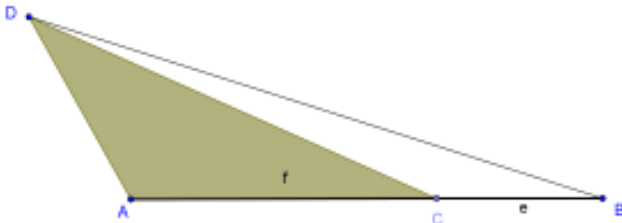

7. If the ratio of similarity between two triangles is 3: 5, what is the ratio of the areas of these triangles?

8. A regular octagon has a perimeter of 64. Find its area.

9. A trapezoid has parallel bases that measure 5 and 15. What is the ratio of the areas of the triangles S and T?
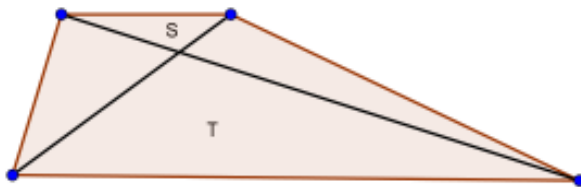
10. An annulus is a ring formed by circles, one inside the other. Find the area of the white annulus in the Target symbol below if the radius of the outermost circle is 9 cm and each inner radius has been dilated by a factor of 1/3.

11. A parallelogram has side that measure 3 and 6 with a 60 degree angle. Find the area of the parallelogram.

12. If the area of a circle is 25π, find its circumference. What is the equation of the circle?

13. An isosceles trapezoid with bases 12 and 16 is inscribed in a circle of radius 10. The center of the circle lies in the interior of the trapezoids. Find the area of the trapezoid.

14. Find the area of a regular decagon with perimeter 80.

15. Find the area of a kite whose longer diagonal is divided into two parts that are 4 and 12 and whose shorter side is 5.

16. In a group of 12 students, only 4 of them like olives on their pizza. If they are sharing a 16-in pizza what is the area of the part the pizza covered with olives? Explain your thought process.

17. Find the area of a regular 36-sided polygon inscribed in a circle of radius 20 cm.

18. What is the minimum amount of wrapping paper needed to wrap a box with dimensions 20 cm by 10 cm by 30 cm? Answer this question by picture the box and thinking of the rectangles on the sides.

19. Suppose you had a circle with radius 5. A *sector* of that circle would be the area enclosed by two radii and an arc. What do you think the area of the sector would be with a central angle of $45°$? $60°$?

20. Playing cards measure 2.25 inches by 3.5 inches. A full deck of fifty two cards is 0.75 inches high. What is the volume of a deck of cards? If the cards were uniformly shifted (turning the bottom illustration into the top illustration), would this volume be affected?
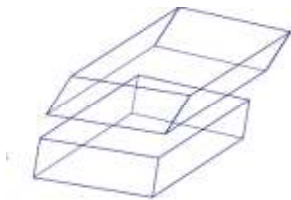
21. In mathematical discussion, a right prism is defined to be a solid figure that has two congruent polygonal bases and rectangular lateral faces that are perpendicular to the bases. How would you find the volume of such a figure? Explain your method.