Session 5.2

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Recap of last time

1. **Rectangle**: key dimensions are **length** and **width**
   (a) $Area = Length * Width$
   (b) $Perimeter = 2 * Length + 2 * Width$
   (c) Dimensions are normally shown as $length \times width$
2. **Right triangle**: key dimensions are **length** and **width**
   (a) $Area = \frac{Length * Width}{2} = \frac{1}{2} * Length * Width$
3. **Circle**: key dimension is the **radius**
   (a) $Diameter = 2 * Radius$
   (b) $Area = (Radius)^2 * \pi$
   (c) $Perimeter = 2 * Radius * \pi = Diameter * \pi$
4. Area is in terms of $units^2$, such as cm^2, in^2, ft^2, etc.
5. Volume is in terms of $units^3$, such as cm^3, in^3, ft^3, etc.
6. Leaving a number "in terms of π" means to leave it as $9 * \pi$ instead of $9 * \pi \approx 9 * 3.14 = 28.26$
7. Outer area – inner area = border area

Main problems

1. Suppose we have a red circle with radius 6" and we color in a white inner circle of radius 4". What is the area that is left red (outer ring)?
2. Consider one 6" $\times$ 8" small rectangle and one 9" $\times$ 10" larger rectangle. What is the ratio of the smaller rectangle's area to the larger rectangle's area?
3. Consider one 12" $\times$ 5" short rectangle and one 18" $\times$ 5" long rectangle. What is the ratio of the shorter rectangle's area to the longer rectangle's area?
4. What is the ratio of the area of a circle with radius 5" to one with radius 10"?
5. What is the ratio of the area of a circle with radius 3" to one with radius 6"?
6. What is the ratio of the area of a circle with radius 3" to one with radius 9"?
7. What is the relationship you see when the radius is double ($\times 2$)? What do you see when the radius is triple ($\times 3$)? What would you guess for quadruple ($\times 4$)?
8. Consider two squares where the ratio of their areas is 4 : 9. If the smaller square has side length 6, then what are the dimensions of the larger square?

9. Consider a 4×7 square small table and a larger table of unknown dimensions. We know that the ratio of the small table's area to the large table's area is $1:4$. What is the area of the larger square table? What are some *possible* dimensions?
10. Consider two circles where the ratio of their areas is $1:4$. If the radius of the smaller circle is 4", what is the radius of the larger circle?
11. Suppose there are two concentric circles, where the inside one is white, and the outer one is red (which leaves a red border). If the radii are 4" and 6", what fraction of the area is red? What if the radii are 2" and 5"?
12. In the previous problem, what fraction of the area is white?
13. Consider two concentric squares: outside red, and inside white, leaving a red border. If we wanted 1/4 of the full area to be white, and the inner square has side length 3", what should we make the dimensions of the squares?
14. Consider the previous problem, but now we want 1/9 of the full area to be white. What are some possible values for both radii?
15. At a restaurant a small burger costs \$9 and a large burger costs \$16. Assuming no discounts and equal heights of the circular burger patties, if the small patty has area 12π, what would you expect to be the area of the larger patty?
16. Suppose the target logo has three concentric circles, with diameters of length 2, 4, and 6 centimeters, respectively. What fraction of the area is red?

Extra problems

1. Problems from 2010 AMC 8