Pied!

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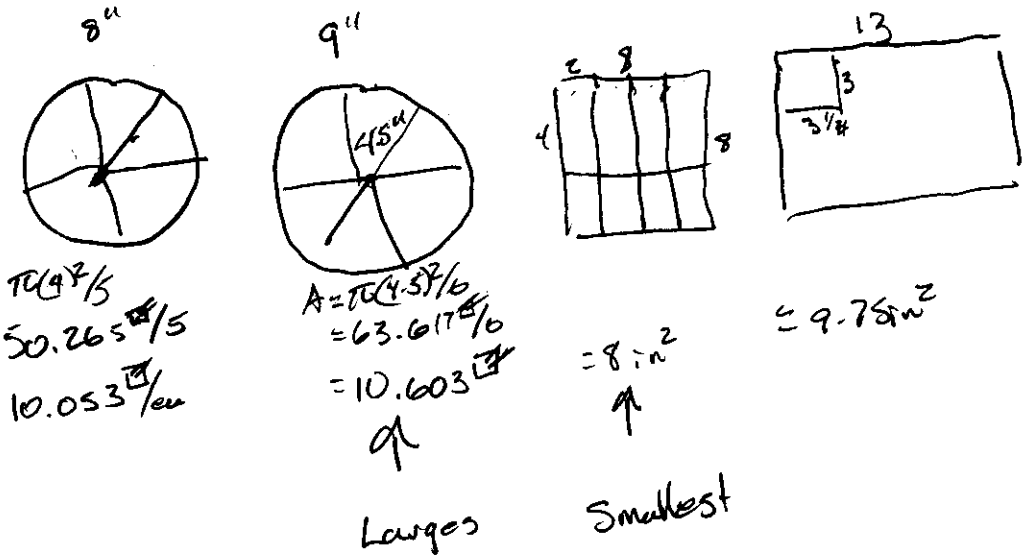
Students have planned several activities to celebrate Pi Day at their school. In addition to pie eating contests and "pie-ing" their favorite teachers, the Math Club plans to make money by selling slices of pie during lunch hour. Each member of the club has contributed a couple of homemade pies for the sale. Unfortunately, the members chose a variety of sizes and shapes of pans to bake their pies in. Some students used 9-inch round pans for their pies, others used 8-inch round pans, a few used 8-by-8 inch square pans, and one student used a 9-by-13 inch cake pan for his pie. Now the club members have the dilemma of how to slice the pies so each slice is about the same amount, since they plan to charge the same amount for each slice of pie regardless of the pan it came from.

After much debate, the club members have decided to slice the 8-inch round pies into 5 equal slices (or **sectors** as the math geeks call them), the 9-inch round pies into 6 equal slices, the 8- by-8 inch pies into 2-by-4 inch rectangles, and the 9-by-13 inch pie into 3-by-3 ¼ inch rectangles.

Although the pieces look like they are all about the same size, some students think there might be a price advantage in buying one type of slice over another.

1. Which slice of pie is the largest and which is the smallest? How did you decide?



2. How big is the central angle for each piece cut from the 8-inch round pan?

$\frac{360°}{5} = 72°$ | $\frac{1}{5} \cdot 360° = 72°$ $\Rightarrow \frac{72°}{360°} = \frac{1}{5}$ or .2

3. How big is the central angle for each piece cut from the 9-inch round pan?

$\frac{360°}{6} = 60°$

You ask your friend to cut a slice of pie for you from the 8-inch pan. He doesn't cut it precisely--in fact, you measure it with your handy protractor and find that he cut the piece 4° too small.

4. How much pie should you have gotten if he had cut it correctly (in *inches*^{2})?

10.053 in^2 from other side

5. How much pie did you actually get (in *inches*^{2})?

$\frac{68°}{360°} = 0.189$ $\quad 0.189 \cdot (\pi 4^2) = 9.495$ in^2

ratio of 68°/360°

The student in charge of quality control for the round pies finds it is too difficult to cut perfect sized pieces of pie each time and suggests that they cut a piece of string that could be used to measure around the outer edge of the pie to let the servers know where to make the next cut.

6. How long should this string be to measure the arc of a slice of pie for the 8-inch round pies?

Circumference

$C = 2\pi r$
$= 2\pi(4)$
$= 25.133$ in → into 5 equal Pieces
$= 5.027$ in

7. How long should this string be to measure the arc of a slice of pie for the 9-inch round pies?

$C = 2\pi r$
$= 2\pi(4.5)$
$= 28.274$ in → into 6 equal Pieces
$= 4.71$ in