

MATHCOUNTS[®] Problem of the Week Archive

Happy Pi Day – March 12, 2018

Problems & Solutions

This Wednesday (3/14) was Pi Day. Here are a few questions in honor of the day.

If Celia ate $1/4$ of $2/3$ of $1/2$ of a pie, what fraction of the whole pie did she eat? Express your answer as a common fraction.

Celia ate $(1/4)(2/3)(1/2) = 1/12$ of the whole pie.

If the top surface of a particular slice of pie is a sector of a circle with a vertex angle measuring 20 degrees and the length of the arc is π units, what is the circumference of the top surface of the whole pie? Express your answer in terms of π .

*Since the sector has a vertex angle that measures 20 degrees, the sector is $20/360 = 1/18$ of the whole pie. Thus, the arc, which has length π units, is $1/18$ of the whole pie's circumference. So, the whole circumference must be **18π** units.*

What is the perimeter of the top surface of the remaining portion of the pie if only the slice described in the previous problem is removed? Express your answer in terms of π .

The perimeter of the remaining portion of the pie consists of the circumference, less the arc of length π units that was removed, and the two radii where the cuts were made. When the sector described in the previous problem is removed, the remaining circumference is $18\pi - \pi = 17\pi$ units. Since the whole pie circumference is 18π , the radius can be found using the equation $C = 2\pi r$. Substituting, we have $18\pi = 2\pi r$, so $r = 18\pi/2\pi = 9$ units. Thus, the total perimeter is $17\pi + 2(9) = \mathbf{17\pi + 18}$ units.

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