

MATHCOUNTS[®] Problem of the Week Archive

Happy Pi Day – March 14, 2022

Problems & Solutions

Today is Pi Day! Below are a few questions to celebrate.

If June ate $\frac{1}{4}$ of $\frac{2}{3}$ of $\frac{1}{2}$ of a pie, what fraction of the whole pie did she eat? Express your answer as a common fraction.

*To determine what fraction of the pie June ate, we can multiply $(\frac{1}{4})(\frac{2}{3})(\frac{1}{2}) = \frac{2}{24} = \frac{1}{12}$. So, June ate **$\frac{1}{12}$** of the 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 $\frac{20}{360} = \frac{1}{18}$ of the whole pie. Thus, the arc (which is π units) is $\frac{1}{18}$ of the whole pie's circumference. So, the whole circumference of the pie 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 question 2 is removed? Express your answer in terms of π .

When the sector described above is removed, the remaining circumference is $18\pi - \pi = 17\pi$. To this, we must add the length of 2 radii for where the cuts were made to remove the piece of pie. Since the whole pie's circumference is 18π , the radius can be found using the equation $C = 2\pi r$: $18\pi = 2\pi r \rightarrow r = 9$. Thus, the total perimeter is $2(9) + 17\pi = \mathbf{18 + 17\pi}$ units.

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