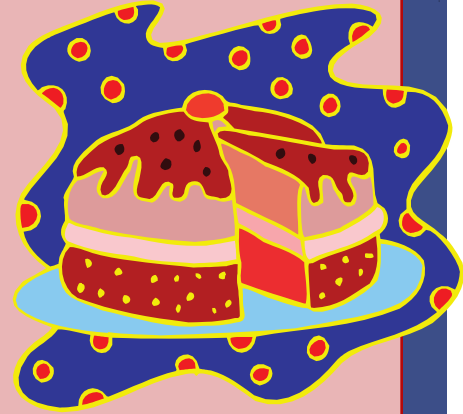


Apply It.

The Math behind CUTTING CAKES...



Math that's used to cut cakes :

Probability, algebra, and modeling.

Uses and Applications:

Modeling strategies that yield fair outcomes in situations involving human nature. A general "cake cutting" strategy decides where a cutter should slice a cake in order to maximize fairness of choice.

How it works:

While there have been many proposed algorithms that model various situations, the basic cake cutting strategy is known as "cut and choose." Here, one person cuts a cake into two portions, and another person chooses one. Suppose, for instance, one half of the cake is chocolate and the other vanilla. Assuming the cutter has some preference (say, desires vanilla three times as much as chocolate), the cutter can decide where to slice by solving a few linear equations – these equations require that the cutter's value of vanilla in both portions is the same, thereby making the chooser's selection irrelevant.

Interesting Fact:

While "cut and choose" is the basic cake cutting strategy involving two people, a recent article in *Notices* ("Better Ways to Cut a Cake," Brams, Jones, Klamler, 2006) describes other general methods that take into account, for example, the cutter or chooser "lying" about how they value the cake or what happens when there are more than two people involved.



– Submitted to the Math Matters, Apply It! contest in January 2007
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