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ONE CUTS, THE OTHER PICKS

THE FIRST UNFAIR SPLIT

In Hesiod's Theogony, PROMETHEUS butchers an ox at a sacrificial feast and lays out two portions for ZEUS to pick between. One is good meat hidden under an ugly stomach lining; the other is bare bones wrapped in glistening fat. Zeus takes the fat and gets the bones. The trick only works because the DIVIDER disguised what he had made. Strip the disguise away and the ARRANGEMENT underneath - one person splits the thing, the other chooses first - is one of the oldest ways people have ended an argument over a single object.

SPELL Spell: **DIVIDER**

DIVIDER

SPELL Spell: **ARRANGEMENT**

ARRANGEMENT

KNOWN Who butchers the ox at the feast and lays out the two disguised portions?

PROMETHEUS

KNOWN Who picks between the two portions and takes the one wrapped in glistening fat?

ZEUS

OPEN If two portions were laid out for you and one hid its true contents, which one would you choose?

Open response - use practitioner judgment

WHY THE RULE WORKS

No referee is needed, because the rule aims the divider's self-interest at fairness. Whoever cuts knows the other picks first and hands back the leftover, so any piece they shave short is the piece they are likely to be stuck with. Their safest cut is one they would accept either way. Neither party ends up wanting what the other holds, an outcome called ENVY-free, and each is guaranteed at least half by their own VALUATION of the parts - a PROPORTIONAL split. Honesty is also the best play here, which makes the rule STRATEGYPROOF.

SPELL Spell: STRATEGYPROOF

STRATEGYPROOF

SPELL Spell: VALUATION

VALUATION

KNOWN When neither person wants what the other is holding, the division is said to be free of what?

ENVY

KNOWN What do you call a split in which each person is guaranteed at least half by their own measure of the parts?

PROPORTIONAL

OPEN If you were the one making the cut, what would you look at first before deciding where it goes?

Open response - use practitioner judgment

MATH Suppose a 900-gram cake is divided proportionally among 4 people, so each is guaranteed an equal share. How many grams is each person guaranteed?

225

THE LAST TO TRIM

Two people are the easy case. Hugo Steinhaus posed the general problem of CAKE cutting - splitting one good among people who value its parts differently - and with Bronislaw Knaster and Stefan Banach built a PROCEDURE known as the last DIMINISHER. A piece is passed around; anyone who thinks it exceeds a fair share trims it down; the last person to trim keeps it, and the others repeat with what remains. Everyone is guaranteed at least a third, or a fourth, by their own measure. Reaching envy-freeness for three took later work by Selfridge and Conway.

SPELL Spell: DIMINISHER

DIMINISHER

SPELL Spell: PROCEDURE

PROCEDURE

KNOWN Steinhaus posed the general problem of splitting one good among people who value its parts differently. What food did he name the problem after?

CAKE

OPEN What would make you decide that a piece being passed around was more than your fair share?

Open response - use practitioner judgment

MATH In the last diminisher procedure with 5 people, the first round gives 4 of them a chance to trim the piece, the next round gives 3, then 2, then 1. How many chances to trim are there in all?

10

WHEN THE CUT FAILS

The rule holds only when the thing can actually be cut. Against INDIVISIBLE goods it fails outright: siblings settling an estate cannot halve a HOUSE, a CAR, a DOG, or a PIANO. And even with a divisible good, a proportional split can be a wasteful one. If you care only about the FROSTING and I care only about the cake, a straight cut leaves us both poorer than a swap would - the result is fair but not PARETO efficient. Fairness and efficiency are different targets, and this rule aims only at the first.

SPELL Spell: PARETO

PARETO

SPELL Spell: FROSTING

FROSTING

KNOWN A house or a violin cannot be cut into smaller shares without destroying it, so no cutting rule can apply. What are such goods called?

INDIVISIBLE

SEMI_OPEN Name two of the estate goods a fair split cannot cut in half.

NEEDS 2 OF HOUSE / CAR / DOG / PIANO

OPEN When two people want different parts of the same treat, what swap would you propose?

Open response - use practitioner judgment

FAIRNESS BY DESIGN

You already use it: handing someone else the knife over the last slice, or letting one roommate divide the rent between two bedrooms while the other picks which room to take. What makes it worth reaching for deliberately is that it settles the argument without requiring anyone to be generous. The fairness sits in the INCENTIVES rather than in the people, which is what ECONOMISTS mean by MECHANISM design. When the object truly will not cut, procedures like adjusted winner do the same job with points instead of a knife.

SPELL Spell: **MECHANISM**

MECHANISM

SPELL Spell: **ECONOMISTS**

ECONOMISTS

KNOWN What is the term for the rewards and pressures built into a procedure, so that each person acting in their own interest still produces a fair split?

INCENTIVES

OPEN One roommate splits the rent between two bedrooms and the other picks first. What would you want to know about a room before you picked?

Open response - use practitioner judgment

MATH In the adjusted winner procedure, each person distributes 100 points across the items in dispute. If a couple is dividing 4 items and one person spreads their points evenly, how many points does each item get?

25