Goal: Review Divider-Chooser, Introduce Lone-Divider

1. Recall from the previous worksheet: Tom and Fred were given a cake worth \$12 that is equal parts strawberry, vanilla and chocolate, their respective values summarized in the chart.



(a) Divide the cake using Divider-Choose assuming Tom is the divider. Determine the 84 value of the assigned share to each party. Solutior S, Sı Tom gets Sz worth \$6 6 Strawberry 86 \$ 6 Tom Ċ Fred gets Vanilla S, worth \$7 Fred S₂ 6 \$2

(b) Divide the cake using Divider-Choose assuming Fred is the divider. Determine the Solution value of the assigned share to each party. S_1 5-Tom gets S2 worth \$12. \bigcirc Om Strawberry 6 Fred gets S, worth \$6. Chocolate S₁ Tom^{\$0}

Tom B12

2. Is it better to be the Divider or the Chooser? Why?

Vanilla

- 3. Lone-Divider Method (for *N* people for $N \ge 3$).
 - 0. Arbitrarily pick a Divider.
 - 1. The Divider divides the items into N shares of equal value to them: s_1, s_2, \dots, s_N .
 - 2. The remaining parties **declare** or **bid** on which the shares, s_1, s_2, \dots, s_N , they consider fair.
 - 3. i. **IF** the *N* shares can be divided among the parties such that each gets a fair share, then do so.
 - ii. IF NOT, then give the Divider a non-contested piece. Then restart Lone-Divider with N 1 parties and recombine the shares.
- 4. **Example 1** Suppose Patrick, Chris, and Travis are splitting a pile of football memorabilia estimated to be worth \$300. It has been split into 3 shares and their respective values are summarized in the table.



5. **Example 2** Suppose Patrick, Chris, and Travis are splitting a pile of football memorabilia estimated to be worth \$300. It has been split into 3 shares and their respective values are summarized in the table.

	<i>s</i> ₁	<i>s</i> ₂	<i>s</i> ₃	_
Patrick	\$100	\$100	\$100	5
Chris	\$90	\$40	\$170	
Travis	\$50	\$90	\$160	
'	1	1		

(a) Circle or highlight each individual's **bid** (the shares they would considered fair).

(b) Determine which person was the Divider.

(c) Determine the next steps of the Lone-Divider Method. Share S₃ is contested. Give Patrick S₁. Recombine S₂ and S₃. Then Chris and Travis will divide this using Divider-Chooser. [G: Will this work? What do you need to check? S₂+S₃ >, \$200.]