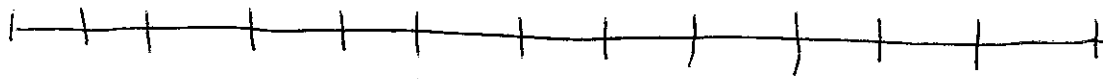
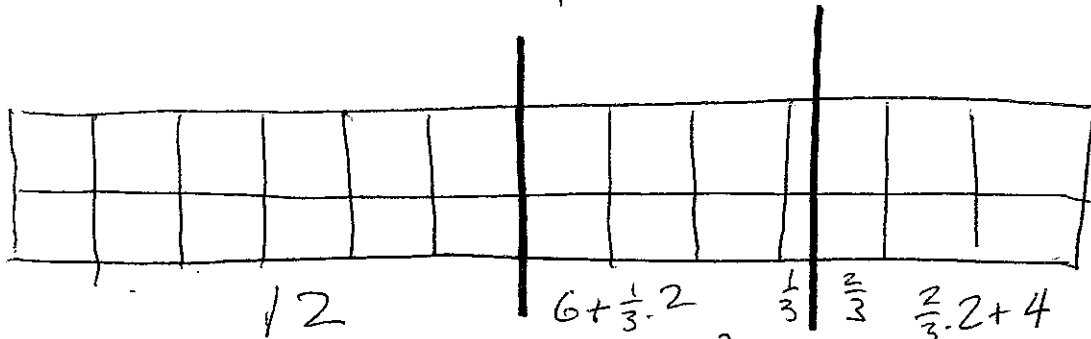


How They view the cake, Cutter = Carol



12 pieces



12

$6 + \frac{1}{3} \cdot 2$

$\frac{1}{3}$

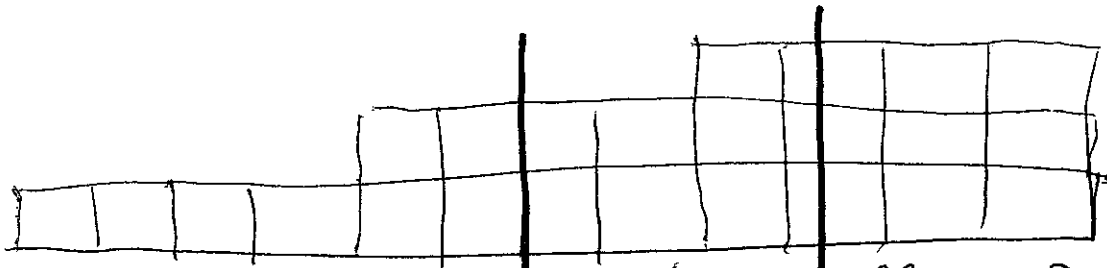
$\frac{2}{3}$

$\frac{2}{3} \cdot 2 + 4$

Bob $6\frac{2}{3}$

$5\frac{1}{3}$

Bob Thinks the cake is split $12 \mid 6\frac{2}{3} \mid 5\frac{1}{3}$



8

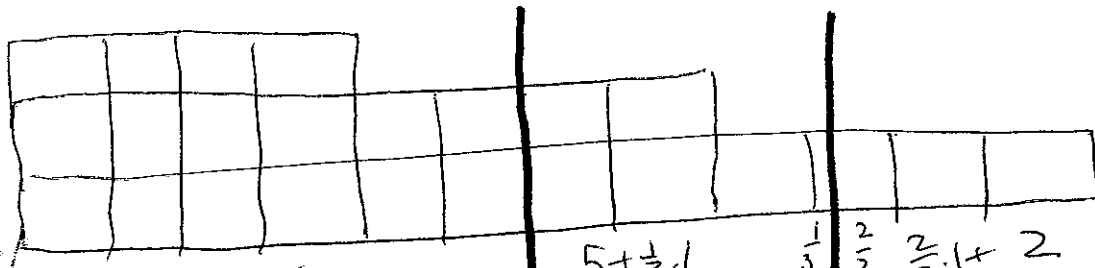
$7 + \frac{1}{3} \cdot 1$

8

$3\frac{2}{3} + 3 + 3$

8

Carol 8



16

$5 + \frac{1}{3} \cdot 1$

$\frac{1}{3}$

$\frac{2}{3}$

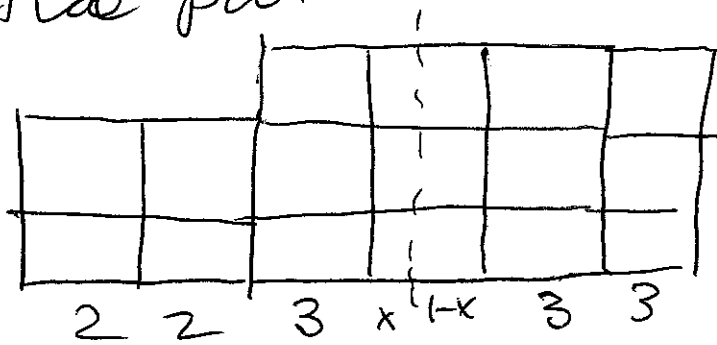
$\frac{2}{3} \cdot 1 + 2$

Ted

Ted Thinks the cake is split $16 \mid 5\frac{1}{3} \mid 2\frac{2}{3}$

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So, given the values assigned to the slices by the players, we have the split on the previous page. If you're not clear on the fractional part:



$$\text{We want } 2 + 2 + 3 + 3 \cdot x = 8 = 3(1-x) + 3 + 3$$

$$\text{or } 7 + 3x = 8 = 9 - 3x$$

$$\text{and } 3x = 1 \text{ or } x = \frac{1}{3}$$

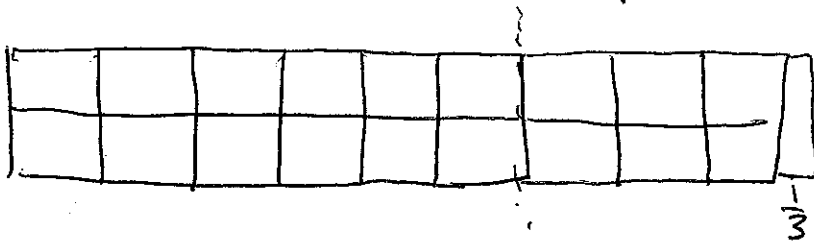
Bob finds piece 1 acceptable $12 > 8$
 pieces 2, 3 unacceptable $8 > 6\frac{2}{3}, 5\frac{1}{3}$

Ted finds piece 1 acceptable $16 > 8$
 pieces 2, 3 unacceptable $8 > 5\frac{1}{3}, 2\frac{2}{3}$

So by the Steinhaus lone divider, we give one of pieces 2+3 to Carol.

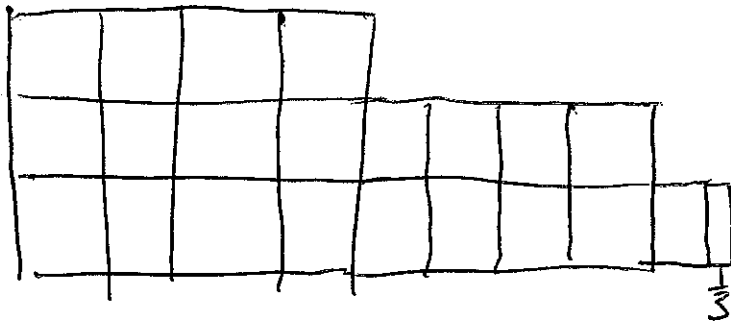
Both Bob and Ted would like piece 3 the least. (In other problems, this might cause a fight.) So there are pieces 1 and 2 left.

This is how Bob sees pieces 1+2 together



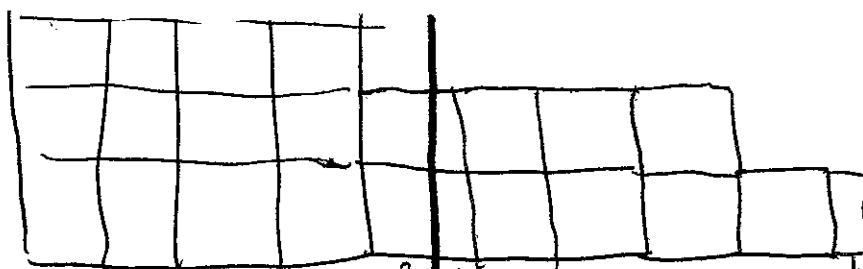
He sees $9\frac{1}{3}$ blocks of width 2, with worth $18\frac{2}{3}$

This is how Ted sees pieces 1+2 together



He sees 4 blocks of width 3	12
4 blocks of width 2	8
$1\frac{1}{3}$ blocks of width 1	$1\frac{1}{3} = 2\frac{1}{3}$

IF Bob cuts the ^{partial} cake in two, he makes two pieces of $\frac{1}{2}(9\frac{1}{3}) = \frac{1}{2} \cdot \frac{28}{3} = \frac{14}{3} = 4\frac{2}{3}$ length each and Ted sees this as

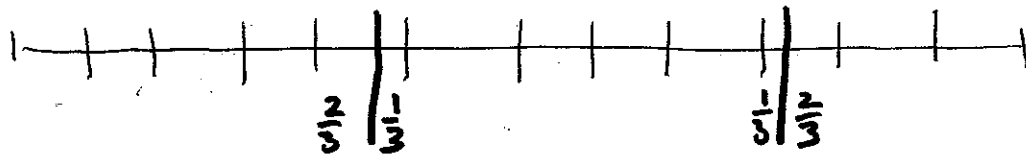


He takes the part to the left

$$12 + 2 \cdot \frac{2}{3} = 13\frac{1}{3}$$

$$2 \cdot \frac{1}{3} + 6 + 1 + \frac{1}{3} = 8$$

The final cut is



↑ Bob's cut

↑ Carol's cut
Remember Carol!

What They Think it's worth.

Bob $4 \cdot \frac{2}{3} \cdot 2 = 9\frac{1}{3}$ $\frac{4 \cdot \frac{2}{3} \cdot 2 = 9\frac{1}{3}}{\quad}$ $2 \cdot \frac{2}{3} \cdot 2 = 5\frac{1}{3}$

↑ What Bob gets

Carol

Carol did not get to choose
in the "new" Piecel, Piece 2
situation

$\frac{2}{3} \cdot 2 + 3 + 3 = 8$

What Carol gets

Ted $\frac{12 + 2 \cdot \frac{2}{3} = 13\frac{1}{3}}{\quad}$ $2\frac{1}{3} + 6 + \frac{1}{3} = 8$ $2\frac{2}{3} - 1 = 2\frac{2}{3}$

What Ted gets

If you want to check your understanding,
redo the last page, but with Ted
cutting the partial cake into

