Homework 16: Chapter 16

Reading: Chapter 16

Book Exercises: 16.2 (Solutions)

Other Exercises: (Solutions)

1. Suppose avid pie-eaters $A$ and $B$ are dividing a homogeneous pie with pumpkin and Boston creme components.

(a) If $A$ likes pumpkin three times as much as Boston creme, describe $A$’s ideal pie - ie, what proportions of the whole would $A$ like each component to be?

(b) If $B$ likes Boston creme four times as much as pumpkin, describe $B$’s ideal pie.

you might want to put this information in a table

(c) Consider these two cuts:

<table>
<thead>
<tr>
<th></th>
<th>$S_1$</th>
<th>$S_2$</th>
<th></th>
<th>$T_1$</th>
<th>$T_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump</td>
<td>$1/3$</td>
<td>$2/3$</td>
<td>Pump</td>
<td>$5/6$</td>
<td>$1/6$</td>
</tr>
<tr>
<td>BosCr</td>
<td>$1$</td>
<td>$0$</td>
<td>BosCr</td>
<td>$0$</td>
<td>$1$</td>
</tr>
</tbody>
</table>

Remember: the cut on the left is $1/3$ pumpkin and all the Boston creme in the first slice, $S_1$, and the rest in $S_2$. For the cut on the right, $T_1$ has $5/6$ pumpkin and none of the Boston creme.

Which cut(s) would $A$ make to guarantee getting $A$’s fair share?

(d) If $A$ makes a good cut for playing I cut you choose using one of the cuts above, which slice would $B$ pick?

(e) There are many cuts that $A$ could make to guarantee getting $A$’s fair share in I cut you choose. Can you find others?