Quiz 18

1. After a glorious upset over the Trinity roosters (bantams? meh), the two ice hockey captains $A$ and $B$ celebrate by using the Adjusted Winner Method to divide a Neapolitan ice cream. Their values:

<table>
<thead>
<tr>
<th></th>
<th>Choc</th>
<th>Van</th>
<th>Straw</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A$</td>
<td>.3</td>
<td>.6</td>
<td>.1</td>
</tr>
<tr>
<td>$B$</td>
<td>.4</td>
<td>.2</td>
<td>.4</td>
</tr>
</tbody>
</table>

(a) Compute the $A$-to-$B$ valuation ratios and fill them out in the table above. (3 pts)

(b) On the hunt for a pareto-optimal and equitable division, we are going to make a threshold cut which splits the Chocolate between $A$ and $B$.

i. What is the ratio associated to this threshold division? Ratio = ________ (1 pt)

ii. Who will get the Vanilla in this threshold cut? Who will get the Strawberry? (2 pts)

Van: ___________ Straw: ___________

iii. Give $A$ and $B$ the Vanilla and Strawberry as above in Part 1(b)ii. Let $x$ = the amount of the Chocolate component we will put in $A$’s slice. Make equations in $x$ that represent $A$’s and $B$’s values for their slices. (2 pts)

\[ x = \text{Choc in A's slice} \]

[A's value of A's slice] \hspace{1cm} [B's value of B's slice]

iv. Use these equations to find an equitable, pareto-optimal division. (2 pts)

Give to $A$: ____________________ Give to $B$: ____________________