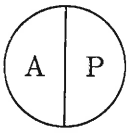
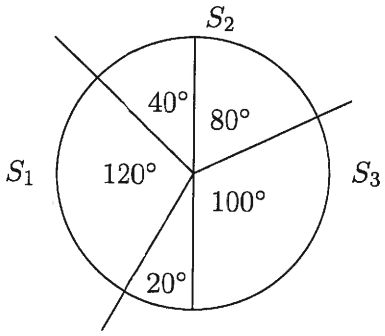
Name:

Quiz 8

Three people decide to use the Steinhaus method to divide a pie that is half apple and half peach. Their preferences are given below right. Suppose D divides the pie as pictured below left.





	A	P
B	1	0
C	X	3X
D	X	X

1. Find the fraction of the whole pie of each piece to each player (notice I've filled some of the table in for you). Then specify the bid list for each player.

	S_1	S_2	S_3	bid lists
B	$\frac{12}{18}$			
C		$\frac{7}{18}$		
D	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	

2. Specify a fair division that could result.

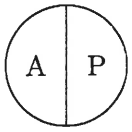
3. Is the division you specified envy-free? If not, who envies whom in this division?

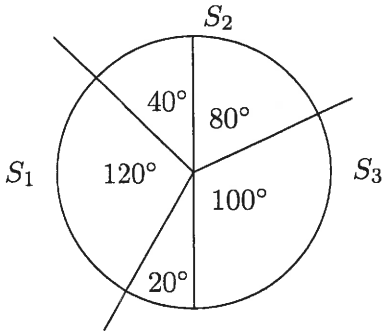
4. Is there another fair division that could result from these bid lists? (yes/no)

Name: Solutions

Quiz 8

Three people decide to use the Steinhaus method to divide a pie that is half apple and half peach. Their preferences are given below right. Suppose D divides the pie as pictured below left.





	A	P
B	1	0
C	X	3X
D	X	X

1. Find the fraction of the whole pie of each piece to each player (notice I've filled some of the table in for you). Then specify the bid list for each player.

B: $S_2 = \frac{40}{180} = 4/18$

$S_3 = \frac{20}{180} = 2/18$

C: $S_1 = \frac{120x}{180x+180(3x)} = \frac{120x}{180(4x)}$

$= \frac{12}{18(4)} = \frac{3}{18}$

$S_3 = \frac{20x+100(3x)}{180(4x)} = \frac{320x}{180(4x)} = \frac{80}{180} = 8/18$

	S_1	S_2	S_3	bid lists
B	$\frac{12}{18}$	$\frac{4}{18}$	$\frac{2}{18}$	S_1
C	$\frac{3}{18}$	$\frac{7}{18}$	$\frac{8}{18}$	S_2, S_3
D	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	all

2. Specify a fair division that could result.

B - S_1
C - S_2
D - S_3

or

B - S_1
C - S_2
D - S_3

3. Is the division you specified envy-free? If not, who envies whom in this division?

No
Couples D

yes

4. Is there another fair division that could result from these bid lists? (yes/no) yes.