

Answers to Odd-Numbered Problems

CHAPTER 14

Exercises 14.1

1. a. 5,937,705 b. 930 c. 0.016% d. Yes
3. a. 20 b. 11 c. No d. C (7 votes)
5. a. S and T
b. S has 280 votes; T has 220. Thus, S is the winner.
7. a. A and C
b. 23 prefer A over C; 12 prefer C over A. Thus, A is the winner.
9. Disney World wins.
11. O (orange) wins with 11 first-place votes.
13. J ($\frac{1}{2}$ cup fresh orange juice) wins with 66 points.
15. J wins with 3 points.
17. Adams
19. a. 12 b. 40 c. 15
d. 18 e. Cappuccino
21. No 23. Beijing
25. Berlin (277 points) 27. Manchester
29. Sydney (45 votes) 31. London
33. No 35. London and Paris
37. Coala Cola (15) 39. Best Cola (93)

Exercises 14.2

1. a. W b. P (65 votes) c. Yes d. W
3. a. C
b. No. L wins under the plurality method, but C wins under the Borda count method.
5. a. Yes. Staples (S) is preferred.
b. Yes. S wins under the plurality method, too.
7. Yes. Washington, D.C. (D), is the winner of the first election and also the winner of the second election with H removed.
9. a. A b. Yes. A c. A d. Yes. A e. C
f. The majority criterion
g. No. A wins.
h. Majority criterion (C wins under Borda, but A has a majority); Condorcet (C wins under Borda, but A wins head-to-head); irrelevant alternatives (C wins under Borda, but B's dropping out causes C to lose to A)
11. a. D b. C c. Yes. C
d. Condorcet (D wins under the plurality with elimination method, but C wins under the head-to-head method)

13. a. B b. Yes c. None
15. a. three b. six c. ten d. $n(n-1)/2$

Exercises 14.3

1. a. \$200,110,285 b. \$9255 c. \$14,675
3. USF: \$266,729,578; UWF: \$66,858,492
5. a. 681.815 b. FAU: 15.730; UCF: 26.858
- 7.

	<i>FTE</i>	<i>Quota</i>	<i>Initial</i>	<i>Extra</i>	<i>Final</i>
UF	29,646	43.4810	43		43
FSU	21,195	31.0861	31		31
FAMU	8064	11.8273	11	1	12
USF	18,176	26.6583	26	1	27
FAU	10,725	15.7301	15	1	16
UWF	4556	6.6822	6	1	7
UCF	18,312	26.8577	26	1	27
FIU	17,434	25.5700	25		25
UNF	6697	9.8223	9	1	10
FGC	1558	2.2851	2		2
Total	136,363		194	6	200

No

9.

<i>State</i>	<i>Cases</i>	<i>Quota</i>	<i>Initial</i>	<i>Extra</i>	<i>Final</i>
CAL	5637	22.7748	22	1	23
FL	5683	22.9607	22	1	23
NY	7655	30.9280	30	1	31
TEX	3715	15.0095	15		15
NJ	2061	8.3269	8		8
Total	24,751		97	3	100

VA2 Answers to Odd-Numbered Problems

11.

<i>Activity</i>	<i>Participants</i>	<i>Quota</i> 5.35	<i>Modified</i> 5.25	<i>Final</i>
Exercise	150	28.0374	28.5714	28
Sports	90	16.8224	17.1429	17
Charity	85	15.8879	16.1905	16
Home repair	130	24.2991	24.7619	24
Computer hobbies	80	14.9533	15.2381	15
Total	535			100

13.

<i>Pet</i>	<i>Cost</i>	<i>Quota</i> 1.08	<i>Modified</i> 1.08	<i>Final</i>
Dogs	190	175.9259	175.9259	176
Cats	110	101.8519	101.8519	102
Birds	10	9.2593	9.2593	9
Horses	230	212.9630	212.9630	213
Total	540			500

15.

<i>Park</i>	<i>Acreage</i>	<i>Quota</i> 20	<i>Modified</i> 20.5	<i>Final</i>
Lake Park	600	30	29.2683	30
E. G. Simmons	470	23.5	22.9268	23
Lettuce Lake	240	12	11.7073	12
Lithia Springs	160	8	7.8049	8
Eureka Springs	30	1.5	1.4634	2
Total	1500			75

17.

			<i>Dade</i>	<i>Brow</i>	<i>Hills</i>	<i>Oran</i>	<i>Pinel</i>
	100	:	33000	21000	17000	11000	11000
			<i>Quotas</i>				
Standard Divisor	930	:	35.48	22.58	18.28	11.83	11.83
Hamilton's Method	930	:	35	23	18	12	12
Modified Quota	948.60	:	34.79	22.14	17.92	11.60	11.60
19. Adams's Method	948.60	:	35	23	18	12	12

21.

			<i>SF Gen</i>	<i>John H</i>	<i>Mass Gen</i>	<i>UC SF</i>	<i>Sloan-K</i>
	200	:	100	72	62	56	50
			<i>Quotas</i>				
Standard Divisor	1.7	:	58.82	42.35	36.47	32.94	29.41
Hamilton's Method	1.7	:	59	42	37	33	29
Modified Quota	1.7238	:	58.01	41.77	35.97	32.49	29.01
23. Adams's Method	1.7238	:	59	42	36	33	30

25. a. A: \$20,000 B: \$40,000 C: \$60,000 D: \$80,000
b. They get the same amounts as in part (a).
c. Yes

Exercises 14.4

1. a. Yes. With 30 seats, α , β , and δ get 6, 8, and 16 seats, respectively. With 31 seats, α , β , and δ get 5, 9, and 17 seats, respectively. So, α *loses* one seat (from 6 to 5) when seats are *increased* from 30 to 31.
b. No
3. Yes. Six Flags Magic Mountain goes from 8 to 7 tickets.
5. a. 1, 4, and 6 million, respectively
b. 2, 4, and 5 million, respectively
c. Kansas (12.63%)
d. Yes. Kansas's population increased by 12.63%, but contributions decreased from \$6 to \$5 million, while Delaware, with a smaller 10.91% increase, got an extra million.
7. a. 2, 4, and 7, respectively
b. 3, 4, and 6, respectively
c. Yes. Even though C's growth rate was 9.78% and A's was 8.99%, C lost a seat and A gained one.
d. C will be unhappy.
9. a. 30 for P and 11 for S
b. Yes. The new apportionment is 29 for P, 12 for S, and 8 for A, so P lost one manager and S gained one.
11. a. 90 for A and 10 for B
b. Yes. The new apportionment is 89 for A and 11 for B, so A lost one seat and B gained one.