Chapter 4 – Test Review

Name: Key
Date: _____

1. A local department store has budgeted for 120 eight-hour retail shifts to be staffed every week. The number of shifts staffed on a single day of the week is apportioned based on the total number of shoppers who visit the store during the day. The following table shows the average daily number of shoppers over a two month period.

Day of the Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Number of Shoppers	8190	4011	6405	7896	10395	15183	10920

What is the *standard divisor* for this apportionment problem?

Answer: 525

2. Based on the scenario from problem 1, what is the *standard quota* for Friday?

Answer: 19.8

3. Based on the scenario from problem 1, how many eight-hour retail shifts should be staffed on Saturday if **Hamilton's Method** is used to do the apportionment?

Answer: 29

4. Clearly explain what it means for a *lower quota violation* to occur.

Answer: A state is apportioned fewer seats than its lower quota.

5. A newly formed Midwestern state is made up of four counties (*A*, *B*, *C* and *D*). The state legislature has a total of 200 seats which need to be apportioned out to each of the counties based on their respective populations. The table below gives the current population of each of the counties.

County	*A*	*B*	*C*	*D*
Population (hundreds)	7258	12463	9627	10652

Use **Hamilton's Method** to apportion the 200 seats.

Answer: A - 36 B - 63 C - 48 D - 53

6. Based on the scenario from problem 5, find a *modified divisor* which would allow the 200 seats to be apportioned using **Jefferson's Method**.

Answer: 197.5 (and others)

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7. A kindly old grandmother is going to distribute 225 pieces of candy to her four grandchildren, *Alex*, *Beth*, *Carl* and *Dave*, based on how many minutes of housework they've completed over the past week. The table below gives the number of minutes each child spent doing housework during the past week.

Grandchild	*Alex*	*Beth*	*Carl*	*Dave*
Minutes Worked	871	1029	610	190

Use **Adam's Method** to apportion the 225 pieces of candy.

Answer: Alex - 72 Beth - 86
Carl - 51 Dave - 16

8. Based on the scenario from problem 7, find a *modified divisor* which would allow the 225 pieces of candy to be apportioned using **Webster's Method**.

Answer: 12.03 (and others)

9. Clearly explain what it means for the *Alabama paradox* to occur?

Answer: Alabama Paradox occurs if the addition of new seats causes the apportionment for a state to decrease.

10. A small country consists of four states, *Awesomeland*, *Bodaciousville*, *Cooltown*, and *Dudesburgh*. The total population of the country is 400,000 people. The table below gives the standard quota for each state.

State	*Awesomeland*	*Bodaciousville*	*Cooltown*	*Dudesburg*
Standard Quota	179.8	129.6	79.2	11.4

What is the population of *Cooltown*?

Answer: 79,200

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11. Your college campus is broken into five sections (*Main Campus*, *North Campus*, *East Campus*, *West Campus*, and *South Campus*). The board of trustees has recently approved the installation of 40 emergency blue lights. The lights will be apportioned based the area of each section (i.e. the larger the section, the more lights). The table below gives the area, in acres, of each section of campus.

Campus Section	*Main Campus*	*North Campus*	*East Campus*	*West Campus*	*South Campus*
Area (acres)	120	430	650	960	1040

What is the *standard divisor* for this apportionment problem?

(a) 50
(b) 60
(c) 70
(d) 80
(e) None of the above.

12. Based on the scenario from problem 1, what is the standard quota for *East Campus*?

(a) 6.5
(b) 8.125
(c) 16.25
(d) 130
(e) None of the above.

13. Based on the scenario from problem 1, how many Emergency Blue Lights would be installed on *Main Campus* if **Hamilton's Method** was used to do the apportioning?

(a) 1
(b) 2
(c) 3
(d) 4
(e) None of the above.

14. Based on the scenario from problem 1, which apportionment results in a violation of the *Quota Rule*?

(a) *Main Campus*: 3; *North Campus*: 5; *East Campus*: 7; *West Campus*: 12; *South Campus*: 13
(b) *Main Campus*: 1; *North Campus*: 5; *East Campus*: 9; *West Campus*: 12; *South Campus*: 13
(c) *Main Campus*: 1; *North Campus*: 6; *East Campus*: 8; *West Campus*: 12; *South Campus*: 13
(d) *Main Campus*: 2; *North Campus*: 5; *East Campus*: 8; *West Campus*: 12; *South Campus*: 13
(e) None of the above.

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15. A newly formed Southern state is made up of four counties (*A*, *B*, *C*, and *D*). The state legislature has a total of 50 seats which need to be apportioned out to each of the counties based on their respective populations. The table below gives the current population of each of the counties.

County	*A*	*B*	*C*	*D*
Population (Thousands)	7258	12463	9642	10637

Use **Hamilton's Method** to apportion the 50 seats.

(a) *A*: 9; *B*: 15; *C*: 12; *D*: 14
(b) *A*: 9; *B*: 15; *C*: 13; *D*: 13
(c) *A*: 9; *B*: 16; *C*: 12; *D*: 13
(d) *A*: 10; *B*: 16; *C*: 12; *D*: 12
(e) None of the above

16. Based on the scenario from problem 5, which *modified divisor* would be appropriate to use if the apportioning was done using **Adam's Method**?

(a) 790
(b) 800
(c) 810
(d) 820
(e) None of the above.

17. Four friends (*Joe*, *Tom*, *Miah*, and *Brownie*) are lost on a tropical island. Luckily the friends find a stash of 75 coconuts. The coconuts will be apportioned based on the weight of each person (i.e. the heavier person is, the more he gets). The table below shows the weight of each of the four friends.

Friend	*Joe*	*Tom*	*Miah*	*Brownie*
Weight (lbs)	220	173	157	200

Use **Jefferson's Method** to apportion the 75 coconuts.

(a) *Joe*: 22; *Tom*: 17; *Miah*: 16; *Brownie*: 20
(b) *Joe*: 21; *Tom*: 18; *Miah*: 16; *Brownie*: 20
(c) *Joe*: 22; *Tom*: 17; *Miah*: 15; *Brownie*: 21
(d) *Joe*: 21; *Tom*: 18; *Miah*: 15; *Brownie*: 21
(e) None of the above.

18. Based on the scenario from problem 7, which *modified divisor* would be appropriate if **Webster's Method** was used to apportion the coconuts?

(a) 9.5
(b) 10
(c) 10.5
(d) 11
(e) None of the above.

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19. The small country of *Fowler*, consisting of four states, *Kudrle*, *Hedges*, *Murray*, and *Kowalowski*, needs to apportion all of the seats in its newly created Parliament. One seat in the Parliament is proportional to 25,000 people from a state's population. The table below gives the standard quotas for each of the states.

State	*Kudrle*	*Hedges*	*Murray*	*Kowalowski*
Standard Quota	33.5	26.7	56.2	103.6

How many seats are there in the Parliament?

(a) 200
(b) 400
(c) 500
(d) 25000
(e) None of the above.

20. Based on the scenario from problem 9, what is the population of *Hedges*?

(a) 5340
(b) 13350
(c) 667500
(d) 837500
(e) None of the above.