Name _____

Minnesota Comprehensive Assessments-Series II

Mathematics Item Sampler
Grade 7

Minnesota
Department
of Education

Mathematics Test — Segment 1

1. Of the students in Tara's class, $\frac{2}{5}$ joined the soccer club. What percent of the students joined the soccer club?

   A.   2.5%

   B.   4%

   C. 25%

   D. 40%

Use the table below to answer question 2.

Height Above Sea Level

Body of Water	Elevation (in feet)
Caspian Sea	–92
Lake Maracaibo	0
Lake Superior	600
Lake Victoria	3,720

2. What is the difference in elevation between the highest and lowest bodies of water listed in the table above?

   A. 3,120 feet

   B. 3,628 feet

   C. 3,720 feet

   D. 3,812 feet

Use the table below to answer question 3.

Rainfall Reported (in inches)

City	Monday	Tuesday
Alexandria	$2\frac{3}{4}$	$1\frac{1}{8}$
Detroit Lakes	$2\frac{5}{16}$	$1\frac{1}{2}$
Park Rapids	$2\frac{3}{8}$	$1\frac{3}{8}$
Wadena	$2\frac{3}{16}$	$1\frac{3}{4}$

3. Four cities reported the amount of rainfall they received for 2 days. Which city's total amount of rainfall for the 2 days was the greatest?

A. Alexandria

B. Detroit Lakes

C. Park Rapids

D. Wadena

4. Keiko bought fruit for 59¢ per pound. She spent $3.00. About how many pounds of fruit did she buy?

- **A.** 3
- **B.** 4
- **C.** 5
- **D.** 6

5. A gymnast has a square practice mat of 144 square meters. What is the length of each edge of the practice mat?

- **A.** 6 meters
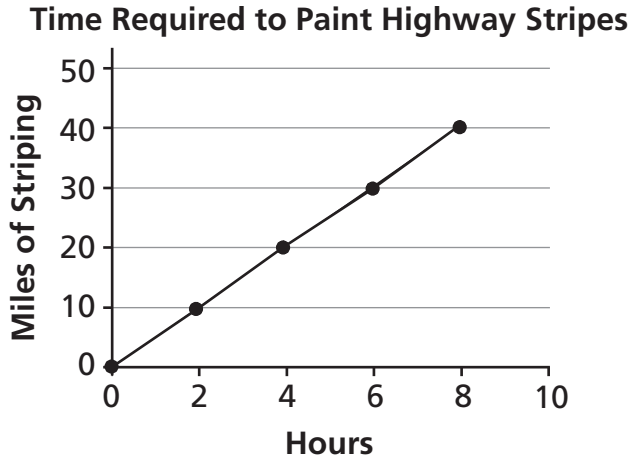- **B.** 12 meters
- **C.** 36 meters
- **D.** 72 meters

Use the numbers below to answer question 6.

$$6^1, \ 3^2, \ 2^3, \ 1^7$$

6. Which shows the numbers ordered from least to greatest?

- **A.** $1^7, \ 2^3, \ 3^2, \ 6^1$
- **B.** $1^7, \ 6^1, \ 2^3, \ 3^2$
- **C.** $6^1, \ 1^7, \ 2^3, \ 3^2$
- **D.** $6^1, \ 3^2, \ 2^3, \ 1^7$

Go on to the next page.

Use the graph below to answer question 7.

Time Required to Paint Highway Stripes

7. The graph shows the amount of time it takes transportation workers to paint stripes along the highway. Approximately how many miles of stripes can they paint in one hour?

A. $\frac{1}{5}$

B. 5

C. 10

D. 40

8. A parade traveled 6 miles in 3 hours. How far did the parade travel per minute?

A. $\frac{1}{20}$ mile

B. $\frac{1}{30}$ mile

C. $\frac{1}{2}$ mile

D. 2 miles

9. There are an equal number of red, orange, blue, green, and purple candies in a bag of 30 candies. Joan picks a candy at random. What is the probability that Joan picks a red candy?
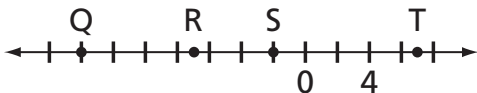
A. $\frac{1}{30}$

B. $\frac{1}{6}$

C. $\frac{1}{5}$

D. $\frac{1}{4}$

Go on to the next page.

Mathematics Test — Segment 2

10. The attendance at an amusement park one year was 15,400,000. What is this number written in scientific notation?

   A. 1.54×10^5

   B. 1.54×10^6

   C. 1.54×10^7

   D. 1.54×100^5

Use the ruler below to answer question 12.

12. Shawn is making a bird house. The directions are to use $1\frac{5}{8}$-inch-long screws. Which point on Shawn's ruler shows $1\frac{5}{8}$ inches?

   A. W

   B. X
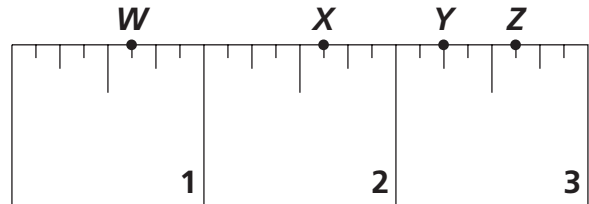
   C. Y

   D. Z

Use the number line below to answer question 11.

11. The low temperature in Duluth, Minnesota, in January was −7 degrees Fahrenheit. Which letter represents −7 on the number line?

   A. Q

   B. R

   C. S

   D. T

13. A car's original price was $26,500. Mr. Thomas paid $23,585. What percent discount did Mr. Thomas receive on the car?

   A. 8.9%

   B. 10%

   C. 11%

   D. 12.4%

Go on to the next page.

14. Sue has 350 newspapers to deliver. She has 28 newspapers still left to deliver. What percent of the newspapers does Sue still have left to deliver?

A. 1%

B. 3%

C. 8%

D. 13%

15. Some classmates compared their scores on a recent math test.

- Molly answered 15 out of every 20 questions correctly.

- Brittany answered 7 out of every 8 questions correctly.

- Desiree answered 7 out of every 10 questions correctly.

- Nick answered 4 out of every 5 questions correctly.

Which student answered more than 80% of the questions correctly?

A. Molly

B. Brittany

C. Desiree

D. Nick

Use the table below to answer question 16.

Lee's Packing Machine

Number of Minutes	Total Boxes Packed
1	93
2	186
3	279
4	372
5	465
6	558
7	651

16. Lee designs packing machines for an engineering company. He recorded the minutes the machine ran and the number of boxes packed in that time. Which observation is most accurate?

A. 93 boxes were packed each minute.

B. A total of 2,604 boxes were packed.

C. The total time the machine could run was 7 minutes.

D. Twice as many boxes were packed each minute.

Go on to the next page.

Use the graph below to answer
question 17.

Basketball
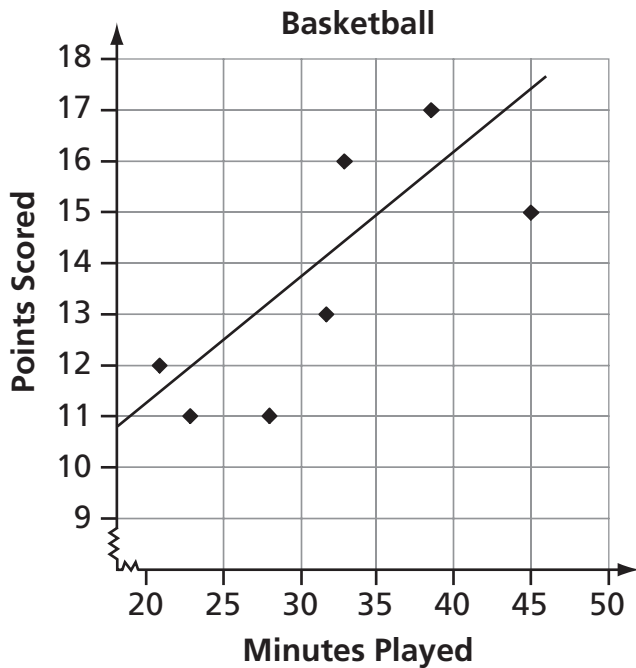
Minutes Played

17. A basketball player made a graph of
the number of minutes he played
versus the number of points he
scored. He drew a line of best fit.
Based on the line of best fit, at what
rate did the player score?

   A. He scored 4 points every
   15 minutes.

   B. He scored 4 points per minute.

   C. He scored 15 points per minute.

   D. He scored 15 points every
   4 minutes.

**Please fill in the grid with your answer to
question 18 on page 3 of your answer
book.**

18. The distance an animal travels over
time can be calculated using the
formula distance = rate • time. A
hawk flew 80 miles in 5 hours. What
was the hawk's rate in miles per
hour?

2

Please write your response to question 19 on page 3 of your answer book.

Use the table below to answer question 19.

MELISSA'S TEST SCORES

Test	Score
1	87
2	93
3	83
4	76
5	88
6	87
7	91
8	78
9	

19. The scores on Melissa's first 8 math tests are listed in the table above. The score on her ninth test raised her mean (average) score.

   Part A   What could have been the score on Melissa's ninth test?

   Part B   Justify your answer by including the old and new means (averages). Show or explain all of your work.

   Part C   Find the old and new medians. Show or explain all of your work.

   Part D   Explain why Melissa's score on her ninth test did or did not change her median score.

Be sure to show all your work in your answer book.

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20. Mrs. Nelson's class has read 50 pages from a book. The class will continue reading 15 pages per day. Which expression represents the amount of pages read after d days?

    A. $15d + 50$

    B. $(15 + 50)d$

    C. $50d + 15$

    D. $(50)(15)d$

21. Jan and Cathy bought school supplies together. They bought a total of 25 pencils and n notebooks. The price of each pencil was 10¢ and the price of each notebook was 75¢. Jan and Cathy split the total cost in half. Which expression shows how much Jan will owe?

    A. $\dfrac{(25 \cdot 0.10 + n \cdot 0.75)}{2}$

    B. $(25 \cdot 0.10) + \dfrac{n \cdot 0.75}{2}$

    C. $\dfrac{(25 \cdot 0.10)}{2} + n(0.75)$

    D. $25 \cdot 0.10 + n \cdot 0.75$

22. Mara read that temperatures in Laos can be as high as 40°C. She used the formula $F = 1.8C + 32$ to change the temperature to degrees Fahrenheit. What is 40°C in degrees Fahrenheit?
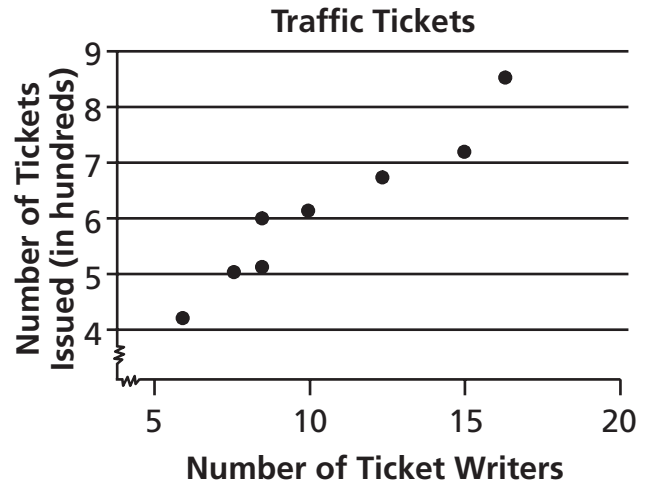
    A. 33.8°F

    B. 72.0°F

    C. 73.8°F

    D. 104.0°F

2

Use the figure below to answer question 23.
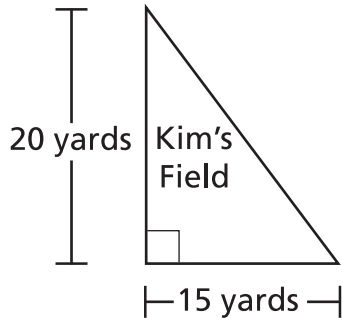
23. Kim's field is a triangle with a base of 15 yards and a height of 20 yards. What is the area of Kim's field?

  A.   60 square yards
  B.   150 square yards
  C.   300 square yards
  D.   600 square yards

Use the scatter plot below to answer question 24.

24. The police department tracked the number of ticket writers and number of tickets issued for the past 8 weeks. The scatter plot shows the results. Based on the scatter plot, which statement is true?

  A.   More ticket writers results in fewer tickets issued.
  B.   There were 50 tickets issued every week.
  C.   When there are 10 ticket writers, there will be 800 tickets issued.
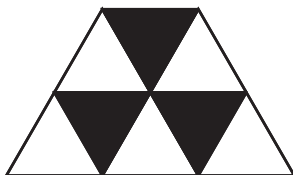 **D.**   More ticket writers results in more tickets issued.

Use the information below to answer question 25.

39 35 23 45 27 26 34 32 23 36

25. The list above shows the number of minutes a family spent in the grocery store on their last 10 grocery shopping trips. What is the mean for the list?

A. 23
B. 26
C. 32
D. 33

Use the diagram below to answer question 26.

26. Megan plays a game at a fair. The game is to toss a beanbag onto the mat above. She wins a prize if the beanbag lands on a black triangle. What is the probability of Megan winning a prize at this game?

A. 12.5%
B. 33.3%
C. 37.5%
D. 50%

27. There were 32 students who completed a survey. There were 18 boys and 14 girls. One survey was picked at random. To the nearest hundredth, what is the probability it was completed by a girl?

A. 0.44
B. 0.56
C. 0.78
D. 1.78

Use the table below to answer question 28.

Reilly's Experiment

Number of Trials	Number of Favorable Outcomes
50	5
100	8
150	16
200	25
250	26
300	31

28. Reilly conducted an experiment and recorded the results in the table above. Which was most likely Reilly's experiment?

   A. Flipping a coin and recording all outcomes that were heads

   B. Choosing a crayon from a bag with 10 different colors and recording all outcomes that were purple

   C. Rolling a number cube numbered 1 to 6 and recording all outcomes that were a 6

   D. Using a spinner with 4 equal divisions numbered 1 to 4 and recording all outcomes that were a 4

29. Melissa knows that if she rolls a number cube once, the probability of rolling a 2 is $\frac{1}{6}$. She rolls the cube 30 times. Which is the best prediction of the number of times a 2 will be rolled?
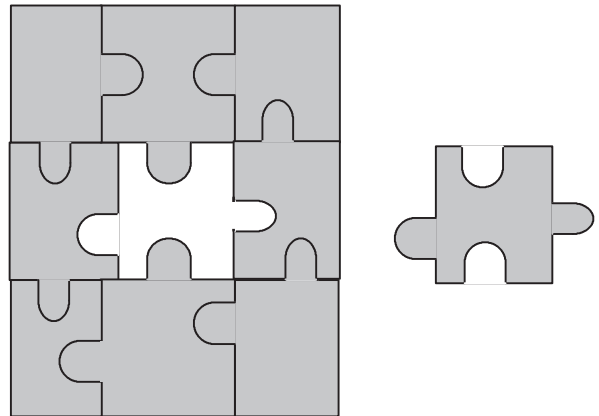
   A. 5

   B. 10

   C. 12

   D. 15

3

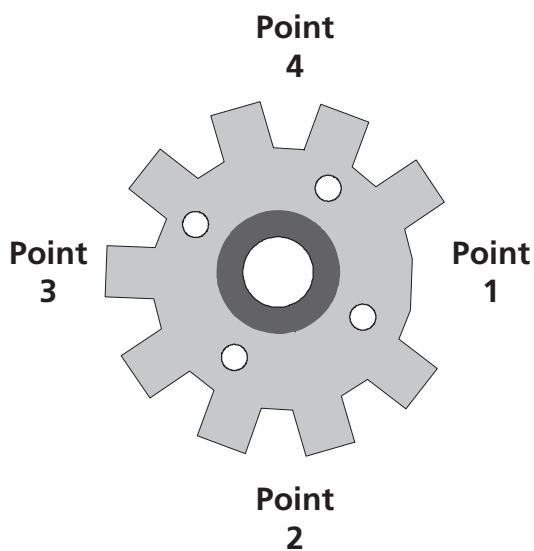Use the figure below to answer question 30.
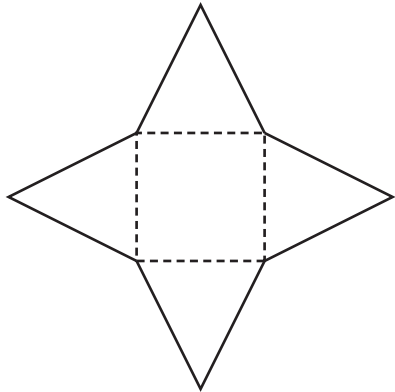
30. Stuart is creating a model from the figure shown above. What 3-dimensional shape is he creating?

A. Square pyramid

B. Rectangular prism

C. Triangular pyramid

D. Cone

Use the figure below to answer question 31.


31. Tyler needs to place the last piece into the puzzle. What transformation does Tyler need to do so the piece will fit?

A. Scale

B. Reflection

C. Rotation

D. Translation

3

Use the figure below to answer question 32.

Point 4

Point 3

Point 1

Point 2

32. The space in the gear above is facing Point 1. The gear rotates clockwise $6\frac{3}{4}$ times and then stops. At which point will the space be facing when the gear stops?

A. Point 1
B. Point 2
C. Point 3
D. Point 4

Use the diagram below to answer question 33.
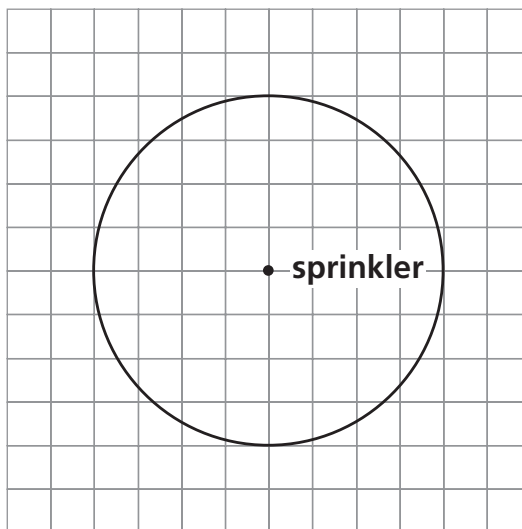
33. A sprinkler is at the center of a lawn. The sprinkler waters the area inside the circle. How many square units will be watered? (Use 3.14 for π.)

A. 25.12
B. 50.24
C. 100.48
D. 200.96

3

34. The circumference of a basketball is 30 inches. What is the approximate diameter of a basketball? (Use 3.14 for π.)

   A. 3.1 inches
   B. 4.8 inches
   C. 6.2 inches
   D. 9.6 inches

Use the diagram below to answer question 35.
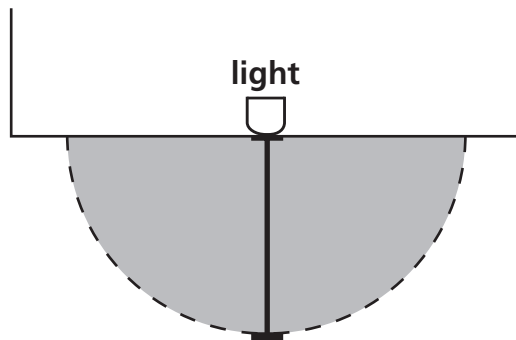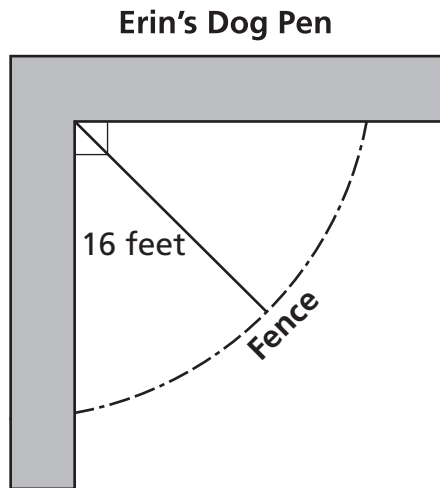

35. Kelly installed a light fixture on her house to light part of her yard. The light shines onto the yard in a semicircle with a radius of 20 feet, as shown above. What is the area of Kelly's yard that is lit by the new light? (Use 3.14 for π.)

   A. 62.8 feet^2
   B. 125.6 feet^2
   C. 628 feet^2
   D. 1,256 feet^2

3

Go on to the next page.

Use the figure below to answer question 36.

Erin's Dog Pen

16 feet

Fence

36. Erin keeps her dog in the pen shown above. The pen is made by 2 walls of a building and a curved fence. What is the approximate length of the fence? (Use 3.14 for π.)

A.   25 feet
B.   50 feet
C.   100 feet
D.   201 feet

37. An architect drew the blueprint for a new office building. He used a scale in which 1 inch represents 7.5 feet. The floor of an office in the building will have actual dimensions of 18 feet by 24 feet. What will be the dimensions on the blueprint?

A.   2.4 inches by 3.2 inches
B.   10.5 inches by 16.5 inches
C.   11.25 inches by 15 inches
D.   135 inches by 180 inches

38. Marcel's drawing of an ant is $4\frac{1}{2}$ inches long. His drawing is 12 times the ant's actual size. How long is the actual ant?

A. $\frac{1}{3}$ inch

B. $\frac{3}{8}$ inch

C. $\frac{1}{2}$ inch

D. $\frac{8}{3}$ inches

3

Go on to the next page.

Bass Drum

$r = 1\frac{1}{2}$ feet

$h = 1\frac{3}{4}$ feet

39. A tablecloth is made of 8 identical pieces as shown above. What shape is each piece of the tablecloth?

    A. Quadrilateral

    B. Parallelogram

    C. Rhombus

    D. Trapezoid

41. The bass drum above is shaped like a cylinder. What is the approximate volume of the bass drum? (Use 3.14 for π.)

    A. 8.2 cubic feet

    B. 12.4 cubic feet

    C. 16.5 cubic feet

    D. 17.8 cubic feet

3

40. A rug has 4 sides and exactly 1 set of parallel sides. What shape is the rug?

    A. Rectangle

    B. Trapezoid

    C. Square

    D. Rhombus

42. Last week, Belinda practiced the violin for 45 minutes each day for 6 days. What was the total amount of time, in hours, that Belinda practiced the violin last week?

A.   2.7

B.   4.5

C.   7.5

D.   11.25

Please fill in the grid with your answer to question 43 on page 6 of your answer book.

43. Kara spent $108.00 at the electronics store. She bought a movie for $18.00. She also bought 3 video games. The video games each cost the same amount. How much did Kara pay for each video game?

3

Go on to the next page.

Please write your response to question 44 on page 6 of your answer book.

Use the figure below to answer question 44.

h

2 ft

4 ft
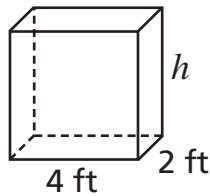
44. Ben is building a wooden box. The base of the box is 2 feet wide and 4 feet long.

Part A What is the area of the base? Show or explain all of your work. Include units in your answer.

Part B Ben wants the volume of the box to be 32 cubic feet. How high should he make the sides of the box? Show or explain all of your work.

Part C It takes Ben 3 hours and 45 minutes to build 1 box. At the same rate, how long would it take him to build 3 boxes? Show or explain all of your work.

3

| **Be sure to show all your work in your answer book.** |

Grade 7 Teacher's Guide
MCA-II Item Sampler Answer Key
Grade 7 Math

Item #	Correct Answer	Item Type	Calculator Designation	Strand	Sub-Strand	Benchmark	Cognitive Level
1	D	MC	NC	II	A	1	B
2	D	MC	NC	II	B	1	B
3	D	MC	NC	II	B	1	B
4	C	MC	NC	II	B	1	A
5	B	MC	NC	II	B	2	A
				I	A	3	
6	B	MC	NC	II	B	5	A
7	B	MC	NC	III	A	1	A
8	B	MC	NC	III	A	1	B
9	C	MC	NC	IV	B	1	B
10	C	MC	CL	II	A	2	A
11	B	MC	CL	II	A	3	A
				I	A	1	
12	B	MC	CL	II	A	3	A
13	C	MC	CL	II	B	3	B
14	C	MC	CL	II	B	4	B
15	B	MC	CL	II	B	4	B
16	A	MC	CL	III	A	1	B
				I	A	3	
17	A	MC	CL	III	A	2	A
				I	A	6	
18	16	GR	CL	III	B	3	B
19	See Annotation	CR	CL	IV	A	2	C
				I	A	4	
20	A	MC	CL	III	B	1	B
21	A	MC	CL	III	B	1	B
22	D	MC	CL	III	B	3	B
23	B	MC	CL	III	B	3	A
24	D	MC	CL	IV	A	1	B
25	C	MC	CL	IV	A	2	A
26	C	MC	CL	IV	B	1	A
27	A	MC	CL	IV	B	1	A
28	B	MC	CL	IV	B	2	B
				I	A	2	
29	A	MC	CL	IV	B	2	A
30	A	MC	CL	V	A	1	A
31	D	MC	CL	V	A	2	A
32	D	MC	CL	V	A	2	B
33	B	MC	CL	V	B	1	B
34	D	MC	CL	V	B	1	B
35	C	MC	CL	V	B	2	B
36	A	MC	CL	V	B	2	B
37	A	MC	CL	V	B	3	B
38	B	MC	CL	V	B	3	B
39	A	MC	CL	V	B	4	A
40	B	MC	CL	V	B	4	A
41	B	MC	CL	V	C	1	B
42	B	MC	CL	V	C	1	B
43	$30	GR	CL	II	B	1	B
				I	A	3	
44	See Annotation	CR	CL	V	C	1	B
				I	A	3	