

DO NOT TURN TO THE NEXT PAGE until your proctor tells you.

Please read the directions carefully.

- ▶ You have 100 minutes for 32 Problems.
- ▶ Mark your answers on your Answer Form with a pencil.
- ▶ Extra scratch paper is neither given nor allowed. You may use blank pages/spaces in the booklet as scratch paper.
- ▶ There are no penalties for incorrect answers. Answer as many problems as you can; go back and check your work and also go to questions you skip, before the time is over.
- ▶ Use of calculators is prohibited. Cell phones must be turned off completely and placed out of sight. MathCON problems are ALL done without a calculator.
- ▶ The problems are divided into three categories by the difficulty levels:
3 Points (Questions 1-8)
5 Points (Questions 9-24)
7 Points (Questions 25-32)
- ▶ Problems 29-32, the last four problems are constructed-response problems. Enter your numerical answer in the grid on your answer sheet as shown on the right.

1. Although not required, it is suggested that you write your answer from left to right in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.

2. Mark no more than one circle in any column.
3. You may start your answers in any column, space permitting. Leave unused columns blank, and there should be no blank columns between columns that are not blank. For example, if your answer is 201, then either arrangement of filled-in circles shown below is acceptable.

For example: Answer: 201 – either position is correct.

	2	0	1
Ⓐ	Ⓐ	●	Ⓐ
Ⓑ	Ⓑ	Ⓑ	●
Ⓒ	●	Ⓒ	Ⓒ
Ⓓ	Ⓓ	Ⓓ	Ⓓ

2	0	1	
Ⓐ	●	Ⓐ	Ⓐ
Ⓑ	Ⓑ	●	Ⓑ
●	Ⓒ	Ⓒ	Ⓒ
Ⓓ	Ⓓ	Ⓓ	Ⓓ

4. No problem has a negative answer.

▶ Notations in Geometry Problems:

- A : Point A
- $\overleftrightarrow{AB}$: Line through points A and B
- $\overline{AB}$: Line segment joining A and B
- AB : Length of the line segment AB
- $\angle ABC$: Angle with the vertex point at B
- $m\angle ABC$: Measure of angle ABC
- $\perp$: Perpendicular
- // : Parallel

1. [Algebra, 3 Points]

The average of m and n is 43.

The average of m and p is 51.

The average of n and p is 60.

What is the **largest** of these three numbers?

A) 68

B) 66

C) 64

D) 60

E) 52

2. [Geometry, 3 Points]

Points K , L , M , N , and P are on a line in that order.

The distance from K to P is 60.

Three times the distance from K to M is two times the distance from M to P .

Point N is halfway between M and P .

What is the distance from K to N ?

A) 34

B) 36

C) 38

D) 40

E) 42

3. [Number Theory, 3 Points]

Abigail has thirty-five cookies. After eating n of them, she splits the rest equally among her four brothers, so that each brother receives a whole number of cookies. Which of the following values for n is **not** possible?



A) 3

B) 7

C) 11

D) 13

E) 19

6. [Geometry, 3 Points]

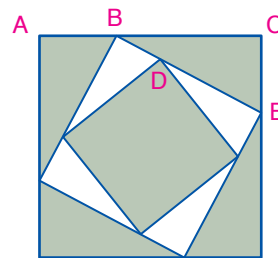
In the given figure,
two of three squares are inscribed,
inner square's corners are on its outer square's sides,

$$AC = 4 \cdot AB$$

$$BE = 4 \cdot BD$$

The ratio of the area of the unshaded (white) regions to that of the shaded (green) regions is $\frac{x}{y}$.

If x and y are positive integers, then what is the **least** value of $x + y$?



A) 58

B) 62

C) 64

D) 69

E) 113

7. [Number Theory, 3 Points]

The following five numbers are obtained by switching two digits of the number 7349.

3749 4379 9347 7439 7394

What is the missing number on the list?

A) 9743

B) 7943

C) 7493

D) 4397

E) 3794

9. [Algebra, 5 Points]

It took Isla three hours and fifteen minutes to hike the 6.5 miles from her camp to the peak. It took her one-third of the time to make the return trip. How fast did Isla hike to the top and back to the camp, on average?

A) 2.75 mph

B) 2.8 mph

C) 3 mph

D) 3.15 mph

E) 3.5 mph