

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]

Three sisters, Nora, Megan, and Bridget, differ in age.

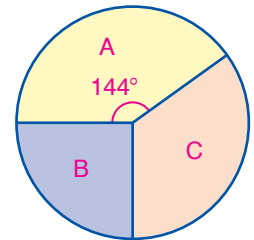
- The sum of Nora and Megan's ages is greater than their mother's age.
- The sum of Nora and Bridget's ages is equal to their mother's age.
- The sum of Megan and Bridget's ages is less than their mother's age.

If the ages of Nora, Megan, and Bridget are N , M , and B , respectively, which of the following arrangements is correct?

- A) $N < M < B$ B) $N < B < M$ C) $M < N < B$ D) $B < N < M$ E) $B < M < N$

2. [Geometry, 3 Points]

A city club offers memberships in categories A, B, and C. The percentages of members of this club are displayed in the pie chart. How many people are members of this club if 300 people are in category A?



- A) 650 B) 700 C) 750 D) 850 E) 900

7. [Number Theory, 3 Points]

Four-digit number 29AB is divisible by 11 and 5, but not divisible by 2.

What is the value of $A + B$?

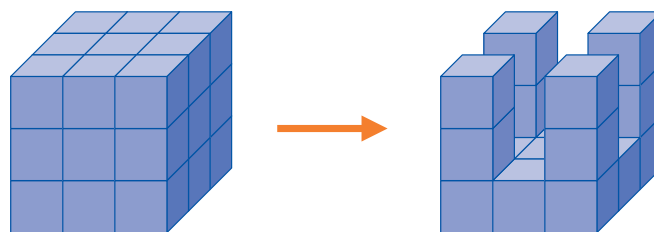
2	9	A	B
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- A) 6 B) 7 C) 8 D) 10 E) 11

10. [Geometry, 5 Points]

The figure on the right was obtained by removing 10-unit cubes from the $3 \times 3 \times 3$ cube made from 27-unit cubes on the left.

How does the surface area of a cube change?



A) Decreased by 6-unit squares.

C) Increased by 2-unit squares.

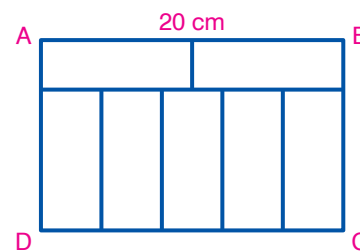
B) Decreased by 8-unit squares.

D) Increased by 6-unit squares.

E) Increased by 8-unit squares.

18. [Geometry, 5 Points]

The rectangle ABCD is formed by seven congruent rectangles. What is the perimeter of ABCD, if $AB = 20$ cm?



A) 78 cm

B) 70 cm

C) 68 cm

D) 66 cm

E) None of the preceding

27. [Number Theory, 7 Points]

n is a positive multiple of 15, such that every digit of n is either 0 or 8.

What is the **smallest** value of $\frac{n}{15}$?

A) 52

B) 58

C) 532

D) 540

E) 592