

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 number A is increased by 60% to get number B.

The number B is decreased by 60% to get the number C.

By what percentage should the number A be decreased to get the number C?

- A) 64% B) 60% C) 56% D) 36% E) 32%

2. [Geometry, 3 Points]

The line-m with a slope of 3 intersects the x-axis at point A.

The line-n with a slope of -4 intersects the x-axis at point B.

What is the area of triangle ABC if both have y-intercept at point C(0, 12), in square units?

- A) 42 B) 56 C) 63 D) 72 E) 84

3. [Number Theory, 3 Points]

One of the sums $x + y$ and $x + z$ is even, while the other one is odd for the integers x, y, and z.

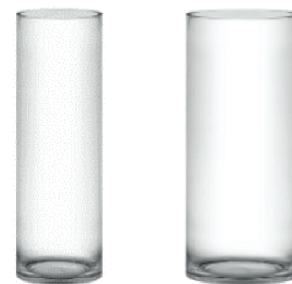
If x is even, which of the following statements must be even too?

- I. $y \cdot z$
 II. $x + y + z$
 III. $(x + 3) \cdot z$

- A) I only B) II only C) I and II only D) II and III only E) I, II, and III

6. [Geometry, 3 Points]

Natalie has two glass cylinder vases. The first one is empty and has a height of 75 cm and a radius of 3 cm. The other one is filled with water and has a height of 75 cm and a radius of 4 cm. Suppose both cylinders of water have the same height after she pours some from the full one into the empty one. What will the height of the water be in both vases?



- A) 32 cm B) 36 cm C) 37.5 cm D) 45 cm E) 48 cm

17. [Algebra, 5 Points]

If $a - b = 10$, then what is the value of the following expression?

$$2a^2 + 3a + 2b^2 - 3b - 4ab + 10$$

- A) 120 B) 240 C) 250 D) 260 E) 480

19. [Number Theory, 5 Points]

The line $y = mx - 20$ passes through the point $(a, 0)$ for positive integers m and a . What is the sum of all possible values of m ?

- A) 20 B) 32 C) 40 D) 42 E) 48