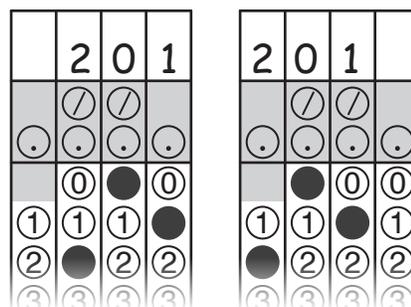# DO NOT TURN TO THE NEXT PAGE
until your proctor tells you.

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.

▶ Calculators are not permitted. 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 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 tha 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. Columns you don't use should be left blanks, 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.
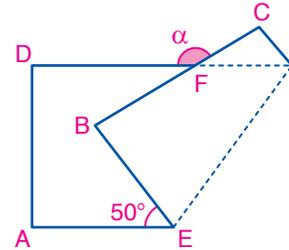
For example: Answer: 201 – either position is correct.

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
∠ABC	: Angle with the vertex point at B
m∠ABC	: Measure of angle ABC
⊥	: Perpendicular
//	: Parallel

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2. [Geometry, 3 Points]

In the figure, rectangle ABCD is folded at point E with m∠AEB = 50°. What is m∠DFC = α?

A) 130°   B) 140°   C) 150°   D) 160°   E) None of the preceding

7. [Number Theory, 3 Points]

A truck's odometer shows 927865 miles. Each digit on this number is different. At least how many miles will it take for this to happen again?

A) 436 miles   B) 238 miles   C) 198 miles   D) 148 miles   E) 128 miles

8. [Combinatorics, 3 Points]

In how many ways can two different integers from 1 to 11 (inclusive), be chosen so that their sum is an even number? (The order does not matter.)

A) 25   B) 30   C) 45   D) 55   E) None of the preceding

9. [Algebra, 5 Points]

Each person in a group of 90 chose one club from art, literature, or music. 56 people in this group did not choose the literature club; 67 people did not choose the art club. How many people in this group chose the music club?

A) 31 　　　　　　 B) 33 　　　　　　 C) 35 　　　　　　 D) 37 　　　　　　 E) 39

17. [Algebra, 5 Points]

Suppose that x and y are positive numbers with

$$x \cdot y = \frac{1}{18}$$
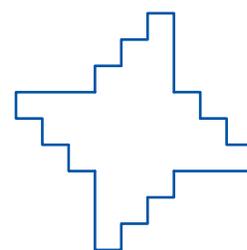$$y \cdot (x + 1) = \frac{2}{9}$$

What is the value of 3x + 6y?

A) 2 　　　　　　 B) 3 　　　　　　 C) 4 　　　　　　 D) 5 　　　　　　 E) None of the preceding

22. [Geometry, 5 Points]

All the adjacent edges in the diagram are at right angles. The four longer edges are equal in length, as are all the shorter edges. What is the area of the shape if the perimeter is 252 cm?

A) 1568 cm² 　　　 B) 1617 cm² 　　　 C) 1666 cm² 　　　 D) 1715 cm² 　　　 E) 1764 cm²

3