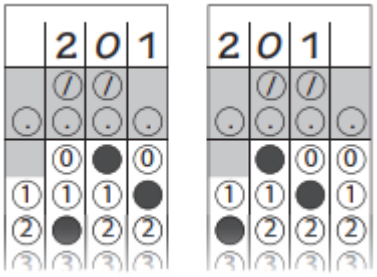
DO NOT TURN TO THE NEXT PAGE until your proctor tells you.

Please read the directions carefully.

- You have **100 minutes** for **40 Problems**.
- Mark your answers on your Answer Form with a pencil.
- Extra scratch paper is neither given nor allowed. You may use blank pages in the booklet as scratch paper.
- There are no penalties for incorrect answers. Answer as many problems as you can; return to the others in the time you have left for the test.
- Calculators are not permitted. Cell phones must be turned off completely and placed out of sight.
- The problems are divided into three categories, Part **A**, Part **B** and Part **C**, according to difficulty level. A correct answer for a Part A problem is worth 3 points, Part B is worth 5 points, and Part C is worth 7 points. Each problem is a multiple-choice problem except the last four problems in Part C.
- Problems 37-40, the last four problems of Part C, 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. Columns you don't use should be left 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.



  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 $\overline{AB}$.
$\angle ABC$	: Angle with the vertex point at B
$m\angle ABC$	: Measure of $\angle ABC$
$\perp$	: Perpendicular
$//$	: Parallel

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Problem 1

Geometry
3 Points

One side of a triangle has length 6.3 and an other side 1.7. How many integer values are possible for the length of the third side?

A) 1

B) 2

C) 3

D) 4

E) 5

Problem 2

Algebra
3 points

In the table the sum of the entries of each columns, rows, and diagonals are equal to 42. Find the value of c.

c		
	$2x + 2$	x
12		20

A) 6

B) 8

C) 10

D) 12

E) 14

Problem 3

Combinatorics
3 Points

A jar contains 5 blue and 6 green balls. Three balls are withdrawn randomly from the jar consecutively without replacement. What is the probability that the first ball would be blue, the second ball green and the third one blue?

A) $\frac{4}{33}$

B) $\frac{9}{110}$

C) $\frac{12}{55}$

D) $\frac{2}{9}$

E) $\frac{6}{11}$

Problem 4

Number Theory
5 Points

A four-digit number $53xy$ is divisible by 3, 4, and 5. What is the sum of all possible x values?

A) 4

B) 7

C) 11

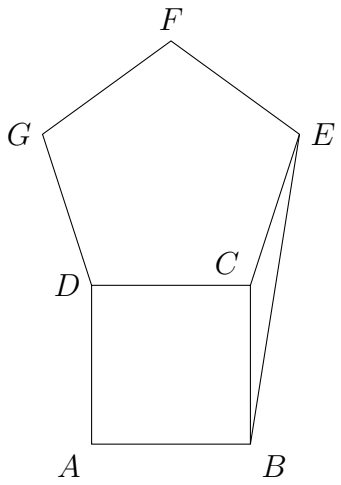
D) 12

E) 13

Problem 5

Geometry
5 Points

A square $ABCD$ and a regular pentagon $CEFGD$ share a common side CD as shown. What is the sum of the degree measures of $\angle CEB$ and $\angle CBE$?



A) 16°

B) 18°

C) 20°

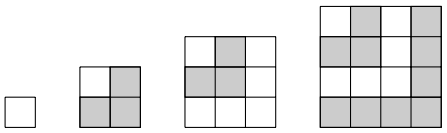
D) 22°

E) 24°

Problem 6

Algebra
5 Points

Based on the pattern, find how many more shaded squares than unshaded squares will be in the 50th diagram in the sequence.



A) 50

B) 60

C) 80

D) 100

E) 150

Problem 7

Algebra
7 Points

Find the value of x for which $100^x \times 1000^{2x} = 10000^{10}$.

A) 3

B) 4

C) 5

D) 6

E) 7

Problem 8

Algebra
7 Points

How many integers n satisfy the double inequality $\frac{5}{19} < \frac{6}{n} < \frac{1}{2}$?

A) 10

B) 12

C) 16

D) 18

E) None of the preceding

Problem 9

Algebra
7 Points

Suppose a, b,c, and d are positive integer such that $a + \dfrac{1}{b + \dfrac{1}{c + \dfrac{1}{d}}} = \dfrac{23}{7}$. Find $a + b + c + d$.

Problem 10

Geometry
7 Points

$ABCD$ is a trapezoid with $\overline{AD}//\overline{BC}$, $\overline{AB} \perp \overline{AD}$, $AB = 8$, $AD = 6$ and $DC = EC = 10$. Find the area of $ABED$?