

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 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 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.

	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 stones are weighed on a scale, two at a time. The scale shows weights of 45 kg, 60 kg, and 75 kg. What is the weight of the **heaviest** stone?

- A) 30 kg B) 35 kg C) 40 kg D) 45 kg E) None of the preceding

2. [Geometry, 3 Points]

The vertices of a triangle are (2, 2), (5, 6), and (8, 2).
 What is the perimeter of the triangle, in units?

- A) 10 B) 12 C) 13 D) 15 E) 16

3. [Number Theory, 3 Points]

The factorial of n is denoted by $n!$ and calculated by the product of whole numbers from 1 to n .
 For example, $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$.

Given that $11! = 39,91A,800$.

What is the value of A ?

- A) 6 B) 5 C) 4 D) 3 E) 2

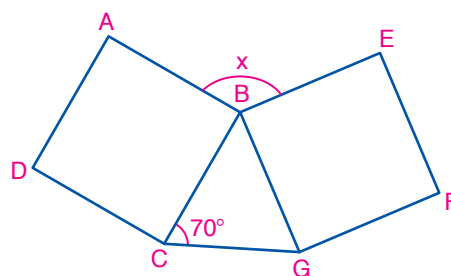
5. [Algebra, 3 Points]

In a local math contest with ten problems, a student gains 5 points for each correct answer and loses 2 points for an incorrect answer. If Arya answered all the problems and scored 29 points, how many questions did she answer correctly?

- A) 6 B) 7 C) 8 D) 9 E) None of the preceding

6. [Geometry, 3 Points]

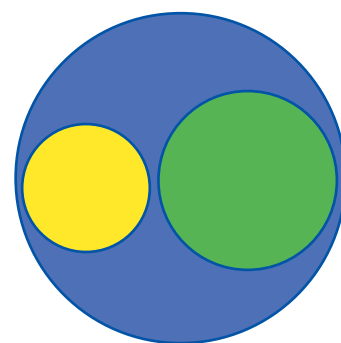
In the given figure, ABCD and BEFG are congruent squares, and $m\angle BCG = 70^\circ$. What is $m\angle ABE = x$?



- A) 100° B) 120° C) 130° D) 140° E) 160°

12. [Combinatorics, 5 Points]

Non-overlapping yellow and green circles are painted on a blue circular board. The radius of the blue board is 9 ft and the radii of the yellow and green circles are 3 ft and 5 ft, respectively. What is the probability that a randomly selected point on the board lies in the blue area?



- A) 58% B) 60% C) 62% D) 64% E) 66%