

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]

Winter items are arranged by price on a store shelf.
The dollar amounts are missing from some price tags.
What is the **greatest** possible cost to buy gloves and a hat?

Socks: \$4.25
Mittens: \$_.50
Gloves: \$_.15
Hat: \$_.75
Scarfs: \$8.40

- A) \$13.90 B) \$14.10 C) \$14.40 D) \$14.90 E) \$15.40

4. [Combinatorics, 3 Points]

A box contains 6 red, 11 blue, and 14 green marbles. Marbles are drawn at random.
What is the **minimum** number of marbles that needs to be drawn to guarantee getting at least one blue marble?

- A) 31 B) 26 C) 21 D) 18 E) 15

5. [Algebra, 3 Points]

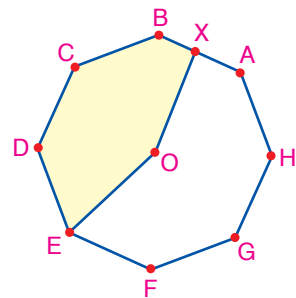
Sarah has a box of chocolates. David eats one-fourth of them. Sarah then gives one-third of the remaining chocolates to her sister, leaving 12 chocolates in the box. How many chocolates were originally in the box?

- A) 18 B) 24 C) 30 D) 36 E) 42

6. [Geometry, 3 Points]

Point O is the center of the regular octagon ABCDEFGH, and X is the midpoint of side AB.

What fraction of the octagon is shaded?



A) $\frac{11}{32}$

B) $\frac{3}{8}$

C) $\frac{13}{32}$

D) $\frac{7}{16}$

E) $\frac{15}{32}$

7. [Number Theory, 3 Points]

What is the sum of all two-digit prime numbers between 40 and 60?

A) 231

B) 237

C) 240

D) 243

E) 245

8. [Combinatorics, 3 Points]

Kamila opens her favorite puzzle book and sees that the product of two facing page numbers is 1056. What is the sum of the two page numbers?

A) 61

B) 63

C) 65

D) 67

E) None of the preceding