

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

3. [Number Theory, 3 Points]

Kalisha thinks of a two-digit whole number.

- It is a perfect square.
- The product of the digits is also a perfect square.

What is the sum of the digits of her number?

- A) 7 B) 9 C) 10 D) 12 E) 13

7. [Number Theory, 3 Points]

A number pattern has nine terms.

- If a term is even, the next term is half of the previous term.
- If a term is odd, the next term is seven more than the previous term.

If the first term in the pattern is 44, what is the 9th term?

- A) 1 B) 2 C) 4 D) 8 E) 9

9. [Algebra, 5 Points]

A total of 70 eggs were in four baskets. After taking out

- five broken eggs from the first basket,
- six broken eggs from the second basket,
- three broken eggs from the third basket, and
- four broken eggs from the fourth basket,

the same number of eggs remained in each basket.

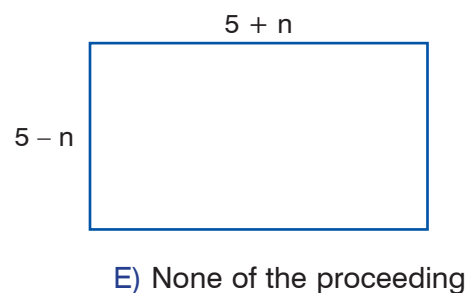
How many eggs were in the second basket before any were removed?



- A) 20 B) 19 C) 18 D) 17 E) 16

10. [Geometry, 5 Points]

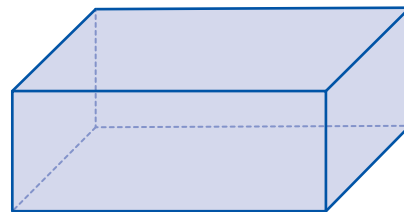
What is the perimeter of the rectangle?



- A) 10 B) 15 C) 20 D) 25 E) None of the proceeding

18. [Geometry, 5 Points]

The volume of a rectangular prism is 21 cm^3 .
Its length, width, and height are all different integers.
What is the total surface area of the prism?



- A) 44 cm^2 B) 54 cm^2 C) 62 cm^2 D) 64 cm^2 E) 72 cm^2

27. [Number Theory, 7 Points]

When 450 is divided by the whole number x , the quotient is x , and the remainder is y .
If $y < x$, then what is the sum $x + y$?

- A) 31 B) 30 C) 29 D) 28 E) 27