SET 13
OLYMPIAD 1

1A
3 MINUTES
61%

Express as a single number:

$$125 \times 25 \times 5 \times 2 \times 4 \times 8$$

1B
3 MINUTES
60%

Find the least whole number N so that $123 + N$ is a perfect square.

1C
5 MINUTES
36%

How many numbers between 19 and 79 are the product of two even numbers?

1D
6 MINUTES
21%

Points A, B, C, and D lie on a straight line in the given order. $AC = 25$ cm and $BD = 46$ cm. The ratio of length CD to length AB is 5:2. Find the length of line segment BC in cm.

1E
7 MINUTES
23%

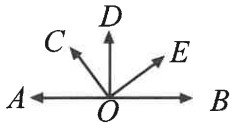
A bookseller has 15 different novels: 4 are in German, 5 are in Spanish, and 6 are in French. Emma buys two novels. They are written in two different languages. In how many different ways can this be done? Ignore the order in which she buys them.

Solutions start on page 254.

SET 13
OLYMPIAD 2

2A
3 MINUTES
47%

As shown, $\overleftrightarrow{AOB}$ is a straight line; $\overrightarrow{OC}$, $\overrightarrow{OD}$, and $\overrightarrow{OE}$ are rays. $\angle COE$ and $\angle DOB$ each contain 90°. $\angle$COB contains 130°. Find the number of degrees in $\angle$DOE.



2B
5 MINUTES
39%

Find the value of the following:

$$\frac{2.3 \times 2.01 + 3.7 \times 2.01}{0.3 \times 4.02}$$

2C
6 MINUTES
25%

Mr. Alvarez gives each of his students 4 sheets of paper and 16 sheets are left over. But if two students were absent, each of the remaining students would receive 5 sheets, with only 3 sheets left over. How many sheets of paper does Mr. Alvarez have?

2D
5 MINUTES
43%.

The sum $1 + 3 + 5 + \cdots + 21 + 23 + 25$ is 169.
Find the sum $1 + 5 + 9 + \cdots + 41 + 45 + 49$, in which each successive term after the first is 4 greater than the previous term.

2E
5 MINUTES
31%

Jess runs an outdoor stand at City Stadium. When it rains, Jess earns \$1500 selling umbrellas. But when it doesn't rain, she earns \$400 selling sunglasses. On any given day, the chance of rain is 40%. On the average, how much can Jess expect to earn daily?

Solutions start on page 256.

SET 13
OLYMPIAD 3

3A
3 MINUTES
50%

Find the number of digits to the left of the decimal point when 500 million is divided by one hundred seventy thousand.

3B
5 MINUTES
37%

Kim multiplies all the counting numbers from 30 through 2 inclusive:

$$30 \times 29 \times 28 \times 27 \times \ldots \times 4 \times 3 \times 2.$$

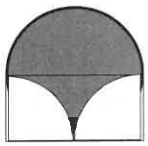
If this expression is rewritten as the product of prime numbers, how many times will 7 be used as a factor?

3C
4 MINUTES
16%

Chloe and Jack play 3 games. The probability that Chloe wins any game is $\frac{3}{5}$. What is the probability that Chloe wins for the first time in the third game?

3D
5 MINUTES
42%

A semicircle rests atop a 12 cm by 6 cm rectangle. Two quarter-circles, each of radius 6 cm are removed from the bottom corners of the rectangle. Find the number of square cm in the area of the shaded region thus formed.



3E
7 MINUTES
16%

Find whole numbers a, b, and c so that

$$a + \frac{1}{b + \frac{1}{c}} = \frac{45}{7}$$

Solutions start on page 258.

SET 13
OLYMPIAD 4

4A
3 MINUTES
69%

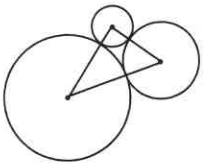
Suppose $52 \times 50 \times N = 40 \times 13 \times 35$.
Find the whole number N.

4B
5 MINUTES
63%

Two consecutive positive integers are each less than 100. One integer is divisible by 17 and the other integer is divisible by 21. Find the greater of the two integers.

4C
5 MINUTES
40%

Three circles are externally tangent as shown. Their areas are 9π, 25π, and 100π square centimeters. A triangle is formed by connecting the centers of the three circles. Find the perimeter of the triangle, in cm.

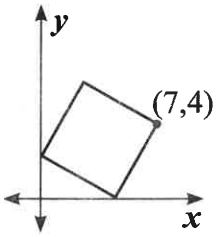


4D
6 MINUTES
57%

The four-digit whole number 3▮11 is exactly divisible by 13.
Find the missing digit ▮.

4E
7 MINUTES
22%

A square is positioned in quadrant I on graph paper so that two vertices lie on the axes, while a third vertex lies at the point (7,4). Find the area of the square.



Solutions start on page 260.

SET 13
OLYMPIAD 5

5A
3 MINUTES
59%

For any two numbers a and b, define the value of $a \bigstar b$ as $a + 3 \times b$. For example, $4 \bigstar 5$ means $4 + 3 \times 5 = 19$. If $2 \bigstar 6$ and $N \bigstar 4$ represent the same number, what is the value of N?

5B
5 MINUTES
45%

Express the product as a fraction in simplest terms.

$$\frac{1}{3} \times \frac{2}{4} \times \frac{3}{5} \times \frac{4}{6} \times \frac{5}{7} \times \frac{6}{8} \times \frac{7}{9} \times \frac{8}{10}$$

5C
5 MINUTES
46%

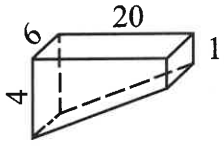
The sum of the integers from -10 through N, inclusive, equals 50. Find N.

5D
5 MINUTES
13%

The Pumas lost 7 of their first 9 games. By winning 75% of their remaining games, they ended with victories in exactly $\frac{2}{3}$ of all their games. In all, how many games did they win?

5E
7 MINUTES
26%

The rectangular top of an in-ground swimming pool is 20 m by 6 m. The pool is 4 m deep at one end and 1 m deep at the other. How many cubic meters of water can the pool hold?



Not drawn to scale.
All measures in meters.

Solutions start on page 262.