

1 **1A** Time: 3 minutes

Express as a single number:

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

2 **1B** Time: 3 minutes

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

3

1C Time: 5 minutes

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

4

1D Time: 6 minutes

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 $\frac{5}{2}$. Find the length of line segment BC in cm.

5

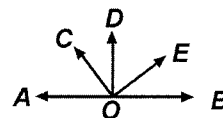
1E Time: 7 minutes

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 ways can this be done? Ignore the order in which she buys them.



6 **2A** Time: 3 minutes

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



7 **2B** Time: 5 minutes

Find the value of the following:

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

8 **2C** Time: 6 minutes

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?

9 **2D** Time: 5 minutes

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.

10 **2E** Time: 5 minutes

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?



11 **3A** Time: 3 minutes

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

12 **3B** Time: 5 minutes

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

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

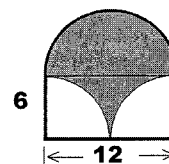
If this expression is rewritten as the product of prime numbers, how many times will 7 be used as a factor?

13 **3C** Time: 4 minutes

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?

14 **3D** Time: 5 minutes

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 Time: 7 minutes

Find whole numbers a , b , and c so that

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



15

4A Time: 3 minutesSuppose $52 \times 50 \times N = 40 \times 13 \times 35$.Find the whole number N .

16

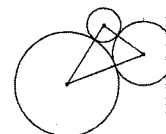
4B Time: 5 minutes

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.

17

4C Time: 5 minutes

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



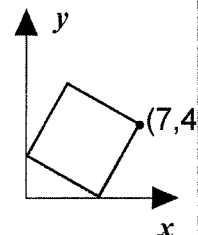
18

4D Time: 6 minutesThe four-digit whole number $3\blacksquare 11$ is exactly divisible by 13.Find the missing digit \blacksquare .

19

4E Time: 7 minutes

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.





20

5A Time: 3 minutes

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

21

5B Time: 5 minutes

Express the product as a fraction in simplest terms.

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

22

5C Time: 5 minutes

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

23

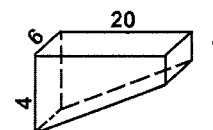
5D Time: 5 minutes

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?

24

5E Time: 7 minutes

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.

