Kangourou Sans Frontières

Math Kangaroo USA 2025

International Competition in Mathematics
Thursday, March 20, 2025

Math Kangaroo USA

Grades 7 and 8

You have 75 minutes to complete the test. ⋆ Calculators are not allowed. ⋆ Mark your answers on the answer sheet.

Problems 3 points each

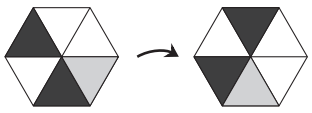
1. Lisa has four wooden digits. She can use them to form the number 2025. Which of the following numbers is the largest she can form with these digits?

2025

(**A**) 2502 (**B**) 5202 (**C**) 5220
(**D**) 5502 (**E**) 5520

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2. Isabelle rotates the hexagonal sheet of paper, as shown. Each rotation turns the hexagon through the same angle in the same direction. The figure shows the result of one rotation. Which of these numbers of rotations would leave the sheet looking as it did at the start?

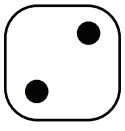


start result of one rotation

(**A**) 7 (**B**) 8 (**C**) 9 (**D**) 10 (**E**) 12

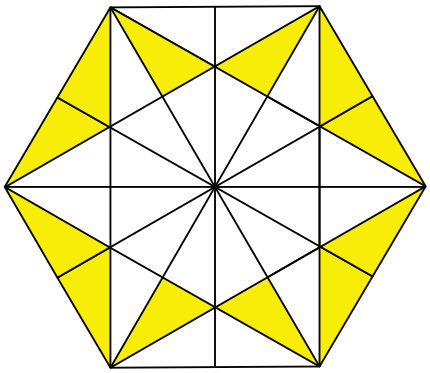
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3. Sandra rolls three dice and gets a total of 8. Each of the three dice shows a different number of dots. Which number of dots could Sandra not have rolled on any of her dice?

(**A**)  (**B**)  (**C**) 

(**D**)  (**E**) 

4. The regular hexagon shown is divided into many triangles of equal area. What fraction of the hexagon is shaded?



(**A**) $\frac{1}{2}$ (**B**) $\frac{1}{3}$ (**C**) $\frac{1}{4}$ (**D**) $\frac{1}{5}$ (**E**) $\frac{1}{6}$

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5. How many sets of 12 minutes are there in 12 hours?

(**A**) 60 (**B**) 24 (**C**) 12 (**D**) 10 (**E**) 6

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6. Daniel is 5 years old. His brother Dominic is 6 years older. What will the sum of their ages be in 7 years?

(**A**) 26 (**B**) 27 (**C**) 28 (**D**) 29 (**E**) 30

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7. Omar wants to write the four digits 2, 0, 2, and 5 in the four boxes of the calculation shown. What is the smallest result that Omar could get?

$\square - \square + \square - \square$

(**A**) -7 (**B**) -6 (**C**) -5 (**D**) -4 (**E**) -3

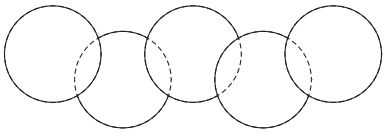
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8. There are ten more truth-tellers than liars in a room. Truth-tellers always tell the truth and liars always lie. Everyone in the room was asked, "Are you a truth-teller?" and everyone gave an answer. A total of 20 people answered, "Yes." How many liars are in the room?

(**A**) 0 (**B**) 5 (**C**) 15 (**D**) 20 (**E**) 25

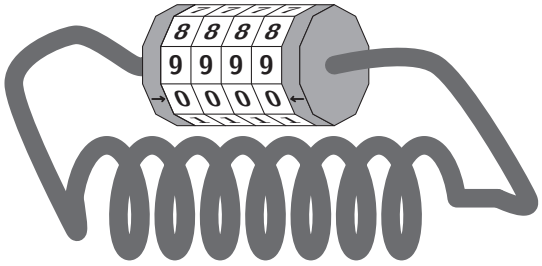
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9. Five circles, each with an area of 8 cm^2, overlap to form the figure shown. The area of each section where two circles overlap is 1 cm^2. What is the total area covered by the figure?



(**A**) 32 cm^2 (**B**) 36 cm^2 (**C**) 38 cm^2
(**D**) 39 cm^2 (**E**) 42 cm^2

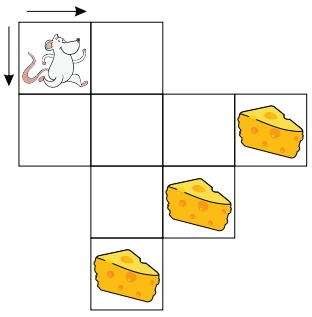
10. The real combination for the bicycle lock shown in the picture is 0000. However, when someone looks at it from the side, they see 8888. When Paul looks at the combination of his friend's lock from the side, he sees 2815. What is the real combination of his friend's lock?



(**A**) 4037 (**B**) 4693 (**C**) 0639 (**D**) 0693 (**E**) 9603

Problems 4 points each

11. Matthew the mouse wants to get to a piece of cheese. He can only move horizontally or vertically between any two cells in the directions shown by the arrows. How many different routes can Matthew take to reach a piece of cheese?

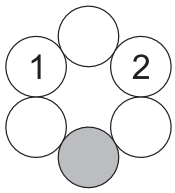


(**A**) 3 (**B**) 5 (**C**) 8
(**D**) 10 (**E**) 11

12. There are five hurdles in a 60 m hurdles race. The first hurdle is after 12 m. The gap between any two consecutive hurdles is 8 m. How far is the last hurdle from the finish?

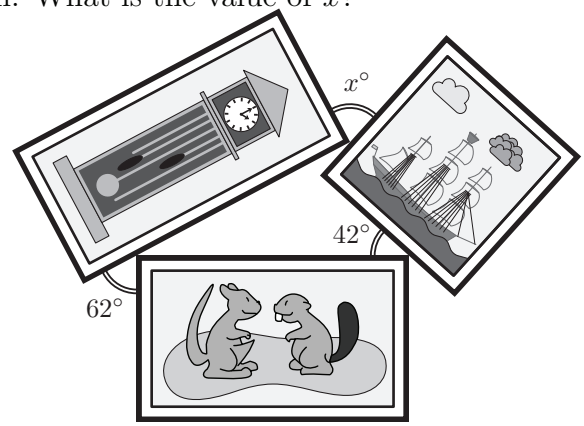
(**A**) 16 m (**B**) 14 m (**C**) 12 m (**D**) 10 m (**E**) 8 m

13. Edgar wants to write a number in each circle in the diagram. He wants each number to be equal to the sum of the numbers in the two adjacent circles. He has already written two numbers, as shown. What number should he write in the gray circle?



(**A**) 2 (**B**) −1 (**C**) −2 (**D**) −3 (**E**) −5

14. Louise places three rectangular pictures in the way shown. What is the value of x?



(**A**) 64 (**B**) 70 (**C**) 72 (**D**) 76 (**E**) 80

15. Warren is on a treadmill in the gym. He keeps looking at two stopwatches. The first shows the time elapsed since he started the session and the second the time remaining until the end of his session.

14:58	21:32

At some point the two stopwatches show the same reading. What do they show at that point?

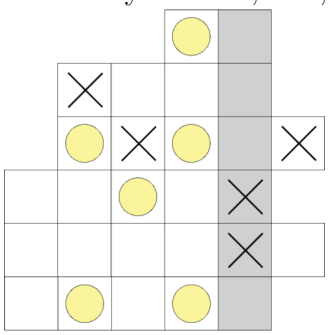
(**A**) 17:50 (**B**) 18:00 (**C**) 18:12
(**D**) 18:15 (**E**) 18:20

16. Julia wants to fill in each $\square$ with a different prime number less than 20 so that the value of A is an integer. What is the maximum value of A?

$$A = \frac{\square + \square + \square + \square + \square + \square + \square}{\square}$$

(**A**) 20 (**B**) 14 (**C**) 10 (**D**) 8 (**E**) 6

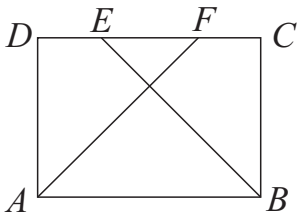
17. Mark wants to fill in the cells on the diagram shown so that each cell contains either a cross or a circle. He also wants to ensure there is no line of four consecutive identical symbols in any column, row, or diagonal.



When he has completed the diagram, what will the column colored gray contain?

(**A**) 3 circles and 3 crosses (**B**) 2 circles and 4 crosses
(**C**) 4 circles and 2 crosses (**D**) 6 crosses
(**E**) a circle and 5 crosses

18. In the rectangle $ABCD$, the points E and F are marked on side DC as shown, so that $\angle EBA = \angle DFA = 45°$ and $AB + EF = 20$ cm. What is the length of BC?

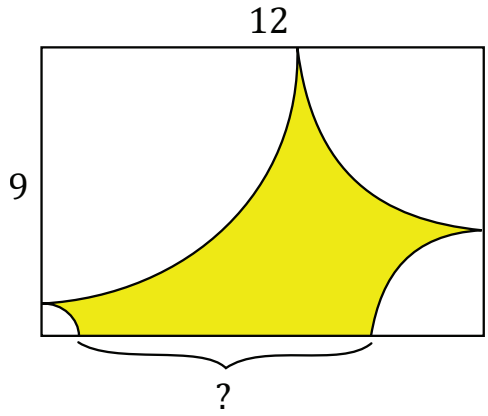


(**A**) 4 cm (**B**) 6 cm (**C**) 8 cm (**D**) 10 cm (**E**) 12 cm

19. Sonia has two bowls of numbered balls. Bowl X contains seven balls numbered 1, 2, 6, 7, 10, 11, and 12. Bowl Y contains five balls numbered 3, 4, 5, 8, and 9. Which ball should Sonia transfer from Bowl X to Bowl Y to increase the average number on the balls in each bowl?

(**A**) 6 (**B**) 7 (**C**) 10 (**D**) 11 (**E**) 12

20. Peter drew a quarter circle with center at each corner of a flag with dimensions 12 cm by 9 cm and colored the region formed, as shown. What is the length indicated by the question mark?



(**A**) 5 cm (**B**) 6 cm (**C**) 7 cm
(**D**) 8 cm (**E**) 9 cm

Problems 5 points each

21. In the six-digit integer $PAPAYA$, different letters stand for different digits and the same letter always represents the same digit. Also $Y = P+P = A+A+A$. What is the value of $P \times A \times P \times A \times Y \times A$?

(**A**) 432 (**B**) 342 (**C**) 324 (**D**) 243 (**E**) 234

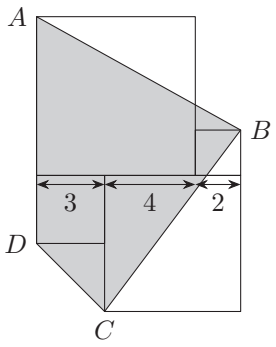
22. During two sessions of soccer training, Paul shoots a total of 17 times at a target. He hits 60% of the shots he shoots in the first session. He hits 75% of the shots he shoots in the second session. How many times did he hit the target in the second session?

(**A**) 6 (**B**) 7 (**C**) 8 (**D**) 9 (**E**) 10

23. Anurag leaves for school at 8:00 a.m. His school is 1 km away. When he walks, his speed is 4 km/h. When he bikes, his speed is 15 km/h. He is 5 minutes early when he walks. How many minutes early is he when he bikes?

(**A**) 12 (**B**) 13 (**C**) 14 (**D**) 15 (**E**) 16

24. Ria draws four squares side by side, as shown. What is the area of the shaded quadrilateral?

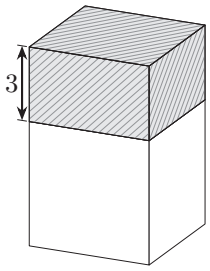


(**A**) 54 (**B**) 60
(**C**) 66 (**D**) 72
(**E**) 80

25. The letters p, q, r, s, and t represent five consecutive positive integers, though not necessarily in that order. The sum of p and q is 69 and the sum of s and t is 72. What is the value of r?

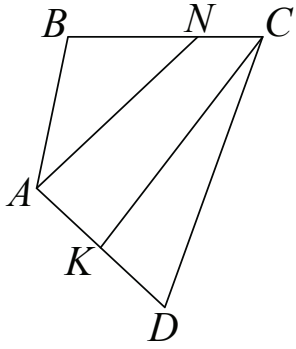
(**A**) 29 (**B**) 31 (**C**) 34 (**D**) 37 (**E**) 39

26. When the height of a cuboid is reduced by 3 cm, its surface area is reduced by 60 cm^2. The resulting shape is a cube. What is the volume of the original cuboid, in cm^3?



(**A**) 75 (**B**) 125 (**C**) 150
(**D**) 200 (**E**) 225

27. In the quadrilateral $ABCD$, the points N and K are marked on sides BC and AD respectively so that $BN = 2NC$ and $AK = KD$. The area of triangle CKD is 2, and the area of triangle ABN is 6. What is the area of quadrilateral $ABCD$?

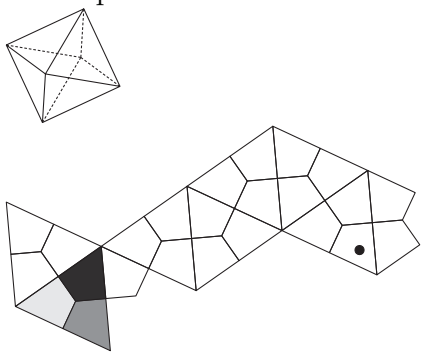


(**A**) 13 (**B**) 14 (**C**) 15 (**D**) 16 (**E**) 17

28. Some birds, including Ha, Long, Nha, and Trang, are perching on four parallel wires. There are 10 birds perched above Ha. There are 25 birds perched above Long. There are five birds perched below Nha. There are two birds perched below Trang. The number of birds perched above Trang is a multiple of the number of birds perched below her. How many birds in total are perched on the four wires?

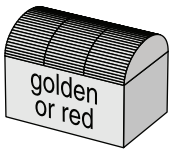
(**A**) 27 (**B**) 30 (**C**) 32 (**D**) 37 (**E**) 40

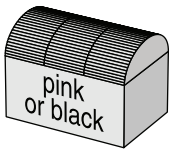
29. The second figure below shows a net of an octahedron. Each face of the octahedron is divided into three parts. The octahedron is colored with the three colors, black, dark gray, and light gray, in such a way that the parts that come out of the same vertex or out of an opposite vertex are the same color. Which color could the part marked with the dot be colored?

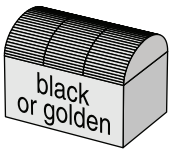


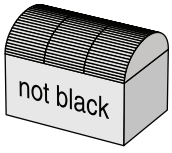
(**A**) Only black.
(**B**) Only dark gray.
(**C**) Only light gray.
(**D**) Both black and dark gray are possible.
(**E**) Both black and light gray are possible.

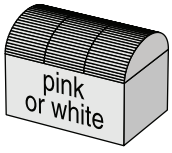
30. Adira keeps golden, red, black, pink, and white pearls in five small boxes. Each box contains pearls of only one color. The boxes are labeled as shown, and all the labels are true. Adira's friend Lilly wants to know which box contains the golden pearls. She may open exactly one of the five boxes to look inside. Which box must Lilly open to be certain which of the boxes contains the golden pearls?

(**A**) 

(**B**) 

(**C**) 

(**D**) 

(**E**) 

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