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1. Starting with 12 Clara follows the arrows using the rules shown at the picture.



What number will she end up with?

(A) 3 (B) 6 (C) 12 (D) 24 (E) 48

3 points

2. There are six points numbered as shown. We create two triangles, one by connecting the points with even numbers, the other one by connecting the points with odd numbers. Which of the five figures do we get?



3. Jessi writes the seven numbers 3, 4, 5, 6, 7, 8, and 9 in the circles at the picture so that the sums of the three numbers in each line are equal. What is the greatest possible sum of three numbers in a line Jessi can get?

(A) 28 (B) 18 (C) 22 (D) 16 (E) 20



•2

4. The year 2022 is a special year because the digit 2 appears three times. This is the third time the tortoise Eva has lived in such a year with three identical digits. At least how old does Eva turn in 2022?

(A) 18 (B) 20 (C) 22 (D) 23 (E) 134

3 points

5. Giulia has one long string of spaghetti she needs to make smaller. Every time she breaks one piece of spaghetti, it becomes three pieces as shown in the picture. Which of the following numbers of pieces can't she get?

 $(A) 13 \qquad (B) 17 \qquad (C) 20 \qquad (D) 23 \qquad (E) 25$



4 points

6. Lisa has 4 dogs. Each of the 4 dogs weighs an integer number of kg. No two of them weigh the same. Their total weight is 60 kg. The second heaviest dog weighs 28 kg. How heavy is the third heaviest dog?

 $(\mathbf{D}) 5 \text{ kg}$

- $(\mathbf{A}) \ 2 \ \mathrm{kg} \tag{\mathbf{B}} \ 3 \ \mathrm{kg}$
- $(\mathbf{C}) 4 \text{ kg}$
- (\mathbf{E}) 6 kg

3 points

7. Cistercian numerals were used in the early thirteenth century. Any integer from 1 to 99 can be represented by a single glyph, combining the glyphs below.



9. Bodil rearranges the 7 pieces in order to get the smallest possible 12 digit number.

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10. The area of the square is 100 cm^2 .



What is the area of the shaded figure?

(A) 20 cm^2 (B) 25 cm^2 (C) 30 cm^2 (D) 35 cm^2 (E) 40 cm^2

11. The picture below shows a transparent paper with a drawing. If the paper is folded twice as shown, what would the folded paper look like?



3 points

12. Pupils in a class are sitting in rows.

There is the same number of pupils in each row. There are 2 rows of pupils in front of Robert, 1 row of pupils behind him, 3 pupils on his left and 5 pupils on his right.

How many pupils are there in this class?

(A) 10 (B) 17 (C) 18 (D) 27 (E) 36

4 points

13. Masoud and his friends have built the number 2022 with 66 cubes.



Then, they painted the whole surface of the structure yellow. After that, how many cubes have exactly 4 faces colored?

(**A**) 16 **(B)** 30 $(\mathbf{C}) \ 46$ (D) 54(E) 60

3 points

14. ABCD is a square with a side-length of 10 cm. What is the area of the shaded part? D

(**B**) 45 cm^2 $(D) 55 \text{ cm}^2$ $(A) 40 \text{ cm}^2$ $(\mathbf{C}) 50 \text{ cm}^2$ $(E) 60 cm^2$

15. Eileen rowed around five buoys, as shown. Which buoys did Eileen row around in a counterclockwise direction?

- (\mathbf{A}) 1 and 4
- (\mathbf{B}) 2, 3 and 5
- (\mathbf{C}) 2 and 3
- (\mathbf{D}) 1, 4 and 5
- $(\mathbf{E}) \ 1 \ \text{and} \ 3$

4 points

16. In each row, in each column and in each set of four circles connected by segments there have to be the four numbers 1, 2, 3, and 4. What number has to be in the circle with a question mark?

$(\mathbf{A}) \ 1$	(\mathbf{B}) 2
(\mathbf{C}) 3	$(\mathbf{D}) \ 4$

 (\mathbf{E}) It cannot be determined

3 points

17. In the garage shown in the figure, vehicles can only move forward or backward, they cannot turn. What is the minimum number of vehicles that will have to move so that the blue car can exit?

- (A) 2**(B)** 3
- (C) 4(D) 5
- (**E**) 6

4 points



3

 $\mathbf{2}$

(3) 1 $\left[4\right]$ 5 $\mathbf{2}$

A

В

C



18. Five big elephants and four small ones are walking along a path, as shown. When they reach the junction, each elephant turns either to the left or to the right. Which of the following cannot be



the situation after they all pass the junction?





19. A cuboid water deposit has dimensions 1m x 2m x 4m. It contains water to a height of 25 cm as shown on the picture to the left. If we turn the deposit so that the base becomes the 1m x 2m face as shown on the picture to the right, how high will the level of water be?

(**D**) 1 m

- (A) 25 cm (B) 50 cm
- (\mathbf{C}) 75 cm
- (**E**) 1.25 m



3 points

20. Marbles are sold in packages of 5, 10 or 25 pieces each. Tom buys exactly 95 marbles. What is the minimum number of packages he buys?

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(A) 4 (B) 5 (C) 7 (D) 8 (E) 10

5 points

21. Some glasses are stacked on top of each other. A stack of 8 glasses is 42 cm tall and a stack of 2



22. In the picture below, each animal represents a positive integer, and different animals represent different integers. The sum of the two integers in each column is written below that column. What is the largest possible sum of the four integers in the first row?



23. To unlock this lock, you get these five hints. What is the right code?



24. There are five big trees and three paths in a park. A new tree is planted so that for each path, there are the same number of trees on both sides. In which region of the park is the new tree planted?

- A Q Q
- $(\mathbf{A}) \mathbf{A} \qquad (\mathbf{B}) \mathbf{B} \qquad (\mathbf{C}) \mathbf{C} \qquad (\mathbf{D}) \mathbf{D} \qquad (\mathbf{E}) \mathbf{E}$

25. Werner chooses four of the numbers 2, 3, 4, 5 and 6 and writes one in each box so that the calculation is correct.



How many of the five numbers could Werner write in the shaded box?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

26. The numbers 3, 4, 5, 6, 7 have to be placed in the five circles below in such a way that the number inside each triangle is the product of three numbers on its vertices.



What is the sum of the three numbers on the vertices of the colored triangle?

(A) 12 (B) 14 (C) 15 (D) 17 (E) 18



28. There are four villages along the road in the following order A, B, C, D. The distance between neighboring villages is 10 kilometers. In village A live 10 students, in B live 20, in C live 30, and in D live 40. The villagers want to build a school so that the total distance traveled by students to the school is as small as possible. Where schould they build the school?

(\mathbf{A}) in A	(\mathbf{B}) in B
(\mathbf{D}) in C	(\mathbf{E}) in D

 (\mathbf{C}) in the middle between B and C

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29. The th	ree pictur	es show a	structure	made from	top	front	right
cubes seen f	from the to	p, front ar	nd right. A	t most how			
many cubes	s could hav	ve been us	ed to build	d it?			
(A) 18	(B) 19	(C) 20	(D) 21	(E) 22			

30. 30 people sit around a round table. Some of them wear a hat. Those who do not wear a hat, must tell the truth, and those who wear a hat can either tell the truth or lie. They all say "At least one of my two neighbors wears a hat ." At most how many of the 30 people do not wear a hat?

(A) 5 (B) 10 (C) 15 (D) 20 (E) 25