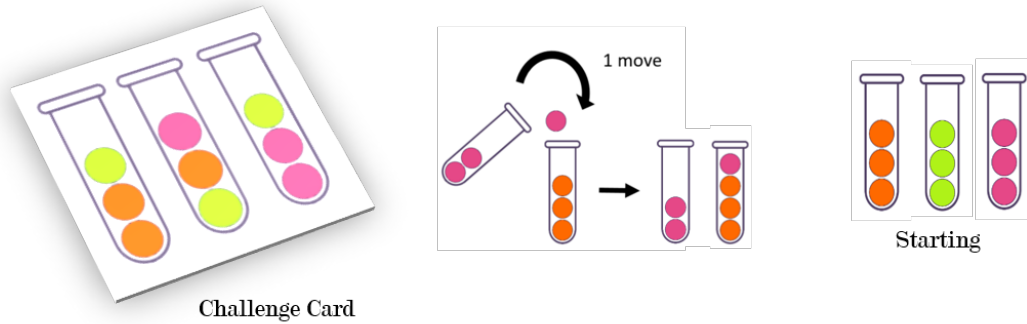


Instructions:

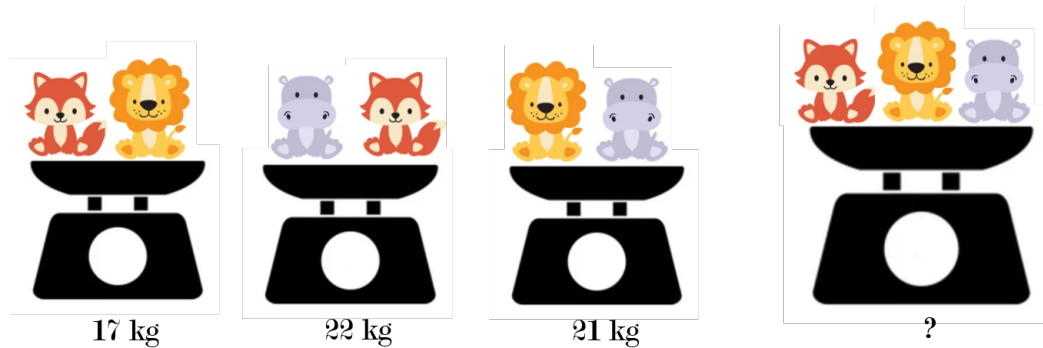
1. Do not open this booklet until you are told by your teacher to begin.
2. Materials: pencil, paper — no other materials. NO calculators!
3. You will have exactly **60 minutes** to work on the contest.
4. This form has 9 questions in Part A, 9 questions in Part B, and 5 questions in Part C.
5. Parts A and B of this contest are multiple choice. Each of the questions in these parts is followed by five possible answers marked A, B, C, D, and E. Only one of these is correct. After making your choice, fill in the appropriate circle on the response form.
6. The correct answer to each question in Part C is an integer from 0 to 99, inclusive. Fill in your number using the appropriate circle(s) on the response form. A one-digit answer (such as “4”) must be coded with a leading zero (“04”).
7. Scoring:
 - Each correct answer is worth:
 - 3 points in Part A,
 - 4 points in Part B,
 - 6 points in Part C.
 - Each unanswered question is worth 1 point.
 - Incorrect answers are worth 0 points.

5. In a certain game, nine coloured balls need to be transferred between tubes to match a challenge card (the order of the tubes does not matter). One move consists of transferring the top ball from one tube to another tube. Each tube starts with 3 balls of a single colour, and each tube can hold at most 4 balls. What is the smallest number of moves needed to match the challenge card below?



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

6. The first three scales show the combined weights of different animals. What is the combined weight of the three different animals?



- (A) 30 kg (B) 38 kg (C) 39 kg (D) 43 kg (E) 60 kg

7. What is one-half of two-thirds of three-quarters of 300 skittles?

- (A) 150 skittles (B) 75 skittles (C) 225 skittles (D) 575 skittles (E) 200 skittles

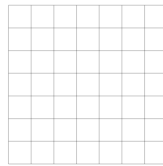
8. Grade 6 students are creating a pattern in a line using the following rules:

- Azra lines up 5 red beads
- Sameeksha adds 2 yellow beads between each of Azra's beads.
- Simran puts 1 green bead between each red and yellow bead.
- Stevie puts 1 white bead between each bead.

How many beads are in the pattern?

- (A) 9 (B) 21 (C) 33 (D) 37 (E) 41

9. What is the smallest number of squares needed to cover a 7×7 square using squares of sizes 1×1 , 2×2 , 3×3 , 4×4 , 5×5 , or 6×6 ? No squares may overlap. You may use squares of the same size more than once, but do not need to use every size.



- (A) 8 (B) 9 (C) 10 (D) 11 (E) 12

Part B (4 points each)

10. The ratio of roses to daisies in Aris's garden was 1:3. After Aris picked 52 daisies (and sold them at \$5 each), the ratio became 3:5. How many more daisies than roses were there at first?

- (A) 26 (B) 52 (C) 78 (D) 117 (E) 260

11. Kahil has more than 150 books but less than 200. 20% of the books are novels and $\frac{1}{7}$ are poems. How many books does Kahil have?

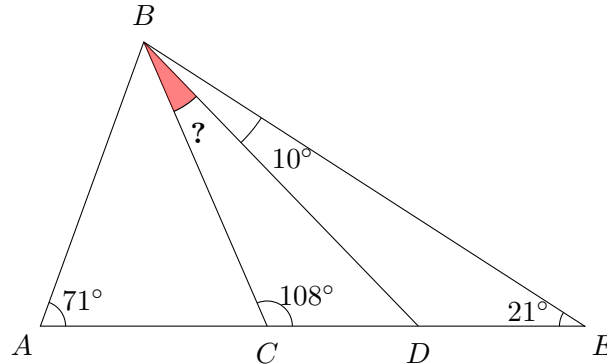
- (A) 140 (B) 165 (C) 175 (D) 185 (E) 210

12. The last week of December 2021 was particularly cold. The table below shows the temperature highs of that week. If the average (mean) temperature highs over the entire week was -20°C , what was the temperature high on December 31st?

Dates	Dec. 25	Dec. 26	Dec. 27	Dec. 28	Dec. 29	Dec. 30	Dec. 31
Temp. highs	-23°C	-27°C	-28°C	-15°C	-21°C	-16°C	?

- (A) -10°C (B) -25°C (C) -16°C (D) -22°C (E) -8°C

13. What is the measure of $\angle CBD$? (Diagram not drawn to scale)



- (A) 10° (B) 31° (C) 41° (D) 72° (E) 1°

14. What is $(-1) + 2 \times (-3) - 4 \times (-5) + (-7) \times 8 - (-9) \times (-10)$?

- (A) -129 (B) 129 (C) 133 (D) -133 (E) 47

15. During a special dinner, 6 rabbits were sitting around a circular table in chairs labelled from A to F.

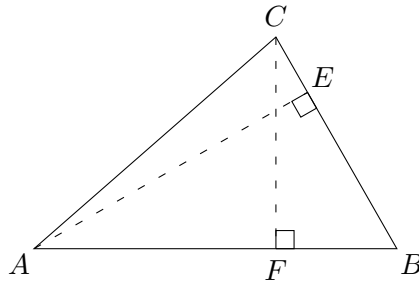


- Leibniz was sitting Gauss' immediate right.
- Gauss was not sitting next to Mirzakhani.
- Mirzakhani was sitting in the chair labeled F.
- Gauss was not sitting directly across from Thales.
- Thales was sitting next to Ramanujan.
- Newton was sitting next to Ramanujan.
- Exactly 1 rabbit was sitting between Thales and Leibniz.
- Newton was not sitting to Mirzakhani's immediate left.

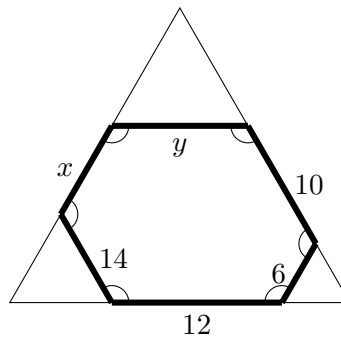
In which chair was Gauss sitting?

- (A) A (B) B (C) C (D) D (E) E

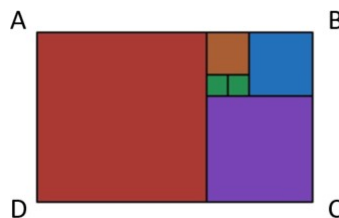
16. In the diagram, triangle ABC has the side lengths $AB = 14$ cm, $BC = 8$ cm and $AC = 12.3$ cm. Given that $CF = 7$ cm, find AE . (Note that CF and AE are both heights.)



- (A) 14 cm (B) 7.25 cm (C) 7 cm (D) 14.25 cm (E) 12.25 cm
17. The sides of a hexagon are 6, 10, y , x , 14 and 12 and all of its internal angles are the same. Three of the sides of the hexagon lie on the sides of an equilateral triangle. Find the perimeter of the hexagon.



- (A) 32 (B) 42 (C) 50 (D) 60 (E) 96
18. Rectangle $ABCD$ is made of squares with side length in a Fibonacci sequence $(1, 1, 2, 3, 5, 8, \dots)$. What will be the perimeter of the entire rectangle after 4 more squares are added?



- (A) 89 (B) 134 (C) 144 (D) 233 (E) 288

Part C (6 points each)

19. Planet X has two types of creatures. The first type has 8 legs and the second has 5 legs. When Mya visited planet X, she met 39 creatures who had 279 legs altogether. How many of these creatures have 8 legs?
20. Buckets A, B and C contain 12 liters, 14 liters and 16 liters of water respectively. $\frac{3}{8}$ of the water from Bucket C was first poured into Bucket B. Then $\frac{1}{3}$ of the water from Bucket A was poured equally into Buckets B and C. In the end, $\frac{4}{11}$ of the water from Bucket B was poured back into Bucket C. How many liters of water are there in Bucket B in the end?



21. Anna has a piece of thin copper wire that is 40 cm long. She makes a square of side-length 3 cm, a rectangle that is 3 cm \times 5 cm, and with the remaining wire she makes a triangle. Since Anna likes isosceles triangles and the number 3, she decides to make an **isosceles triangle with at least one of its sides being 3 cm**. How many possible triangles could Anna have made?
22. Teaghan wrote the number 300. She then continues to write more numbers according to the following rules:
- if the previous number is odd, she multiplies it by 3 and subtracts 1;
 - if the previous number is even, she divides it by 2.
- What is the 2,022nd number that she writes?
23. Kaylin added all integers from 10 to 99 (that is, $10+11+\dots+98+99$). However, she accidentally swapped the digits of one of the numbers, and got the incorrect answer of 4932. What is the largest possible number whose digits Kaylin might have swapped?