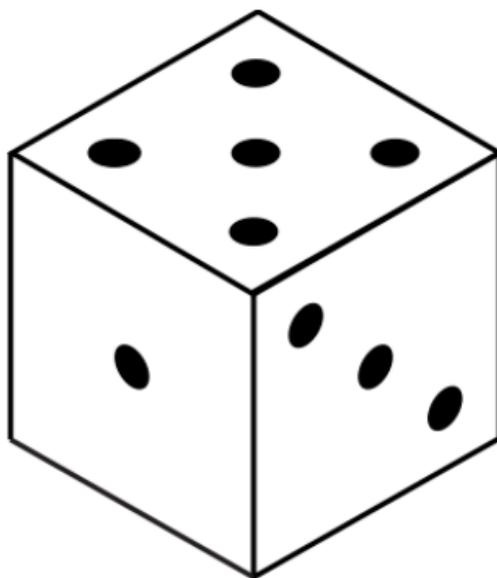# 2022 Gauss 8 Contest

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1. The regular pentagon shown has a side length of 2 cm.
The perimeter of the pentagon is
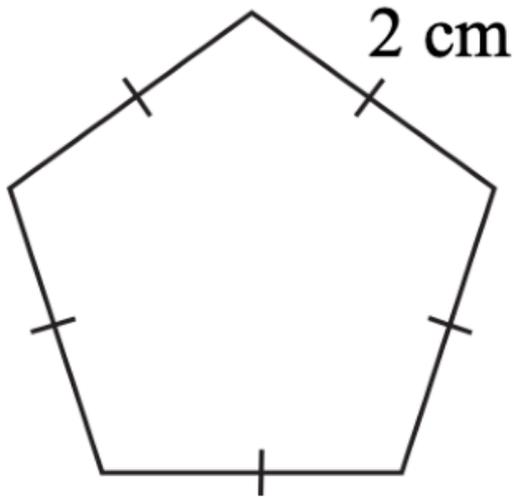
(A) 2 cm (B) 4 cm (C) 6 cm (D) 8 cm (E) 10 cm

2. The faces of a cube are labelled with 1, 2, 3, 4, 5, and 6 dots. Three of the faces are shown. What is the total number of dots on the other three faces?
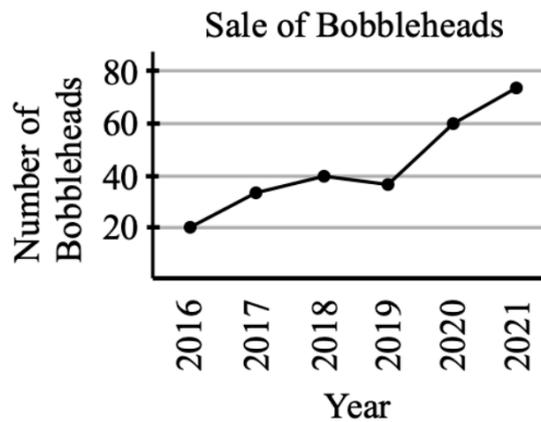

(A) 6 (B) 8 (C) 10 (D) 12 (E) 15

3. The equation that best represents "a number increased by five equals 15" is

(A) $n - 5 = 15$

(B) $n \div 5 = 15$

(C) $n + 5 = 15$

(D) $n + 15 = 5$

(E) $n \times 5 = 15$

4. The line graph shows the number of bobbleheads sold at a store each year. The sale of bobbleheads increased the most between
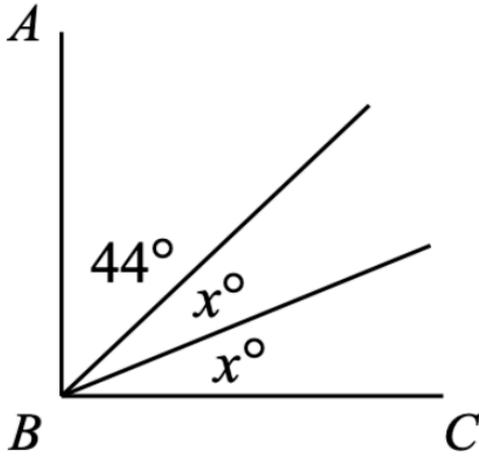

Sale of Bobbleheads

(A) 2016 and 2017

(B) 2017 and 2018

(C) 2018 and 2019

(D) 2019 and 2020

(E) 2020 and 2021

5. Starting at 72, Aryana counts down by 11s: 72, 61, 50,.... What is the last number greater than 0 that Aryana will count?

(A) 4   (B) 5   (C) 6   (D) 7   (E) 8

6. In the diagram, $\angle\,\mathrm{ABC} = 90\,\mathrm{deg}$. The value of x is

(A) 68   (B) 23   (C) 56   (D) 28   (E) 26

7. Which of the following values is closest to zero?

(A) –1

(B) $\dfrac{5}{4}$

(C) 1^2

(D) $-\dfrac{1}{4}$

(E) $-\dfrac{4}{5}$

8. A jar contains 267 quarters. One quarter is worth $0.25. How many quarters must be added to the jar so that the total value of the quarters is $100.00?

(A) 33   (B) 53   (C) 103   (D) 133   (E) 153

9. A package of 8 greeting cards comes with 10 envelopes. Kirra has 7 cards but no envelopes. What is the smallest number of packages that Kirra needs to buy to have more envelopes than cards?

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

10. For the points in the diagram, which statement is true?
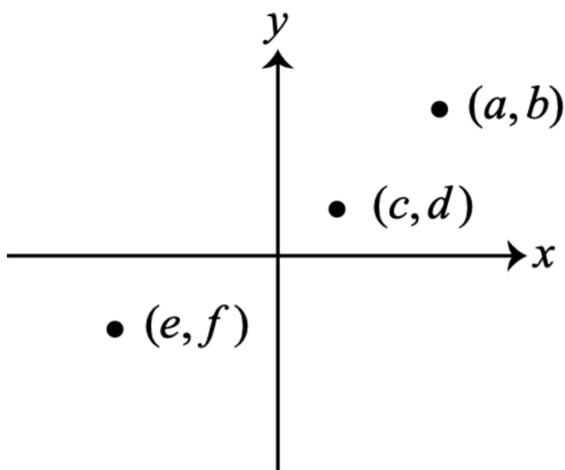
(A) $e > c$ (B) $b < d$ (C) $f > b$ (D) $a < e$ (E) $a > c$

11. The 26 letters of the English alphabet are listed in an infinite, repeating loop: ABCDEFGHIJKLMNOPQRSTUVWXYZABC... What is the 258th letter in this sequence?

(A) V   (B) W   (C) X   (D) Y   (E) Z

12. A public holiday is always celebrated on the third Wednesday of a certain month. In that month, the holiday cannot occur on which of the following days?

(A) 16th   (B) 22nd   (C) 18th   (D) 19th   (E) 21st

13. A circular spinner is divided into three sections. An arrow is attached to the centre of the spinner. The arrow is spun once. The probability that the arrow stops on the largest section is 50%. The probability it stops on the next largest section is 1 in 3. The probability it stops on the smallest section is

(A) $\dfrac{1}{4}$

(B) $\dfrac{1}{5}$

(C) $\dfrac{1}{6}$

(D) $\dfrac{1}{7}$

(E) $\dfrac{1}{8}$

14. A positive number is divisible by both 3 and 4. The tens digit is greater than the ones digit. How many positive two-digit numbers have this property?

(A) 4   (B) 5   (C) 6   (D) 7   (E) 8

15. A rectangular pool measures 20 m by 8 m. There is a 1 m wide walkway around the outside of the pool, as shown by the shaded region. The area of the walkway is
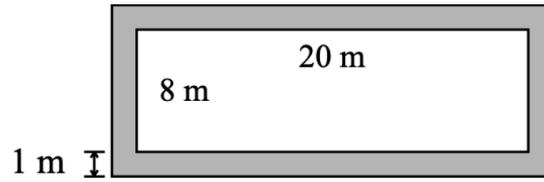
(A) $56m^2$　　(B) $60m^2$　　(C) $29m^2$　　(D) $52m^2$　　(E) $50m^2$

16. The results of asking 50 students if they participate in music or sports are shown in the Venn diagram. What percentage of the 50 students do not participate in music and do not participate in sports?
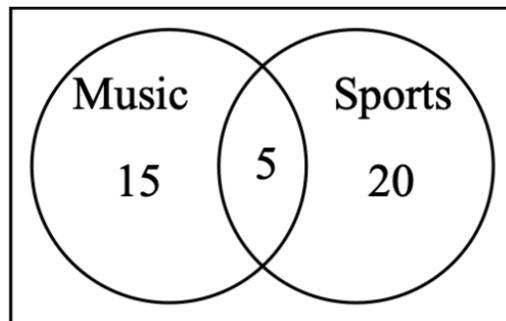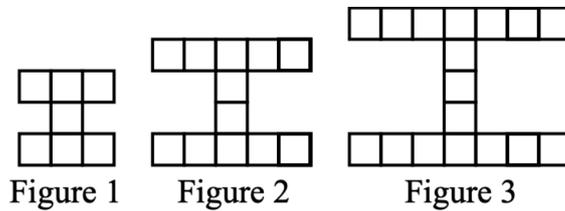

(A) 0%　　(B) 80%　　(C) 20%　　(D) 70%　　(E) 40%

17. There are $\frac{3}{5}$ as many golf balls in Bin F as in Bin G. If there are a total of 80 golf balls, how many fewer golf balls are in Bin F than in Bin G?

(A) 15   (B) 30   (C) 50   (D) 60   (E) 90

18. In the sequence shown, Figure 1 is formed using 7 squares. Each figure after Figure 1 has 5 more squares than the previous figure. What figure has 2022 squares?

Figure 1   Figure 2   Figure 3

(A) Figure 400   (B) Figure 402   (C) Figure 404   (D) Figure 406   (E) Figure 408

19. Mateo's 300 km trip from Edmonton to Calgary passed through Red Deer. Mateo started in Edmonton at 7 a.m. and drove until stopping for a 40 minute break in Red Deer. Mateo arrived in Calgary at 11 a.m. Not including the break, what was his average speed for the trip?

(A) 83 km/h   (B) 94 km/h   (C) 90 km/h   (D) 95 km/h   (E) 64 km/h

20. Equilateral triangle ABC has sides of length 4. The midpoint of BC is D, and the midpoint of AD is E. The value of EC^2 is

(A) 7   (B) 6   (C) 6.25   (D) 8   (E) 10

21. The positive factors of 6 are 1, 2, 3, and 6. There are two perfect squares less than 100 that have exactly five positive factors. What is the sum of these two perfect squares?

(A) 177   (B) 80   (C) 145   (D) 52   (E) 97

22. In the list p, q, r, s, t, u, v, each letter represents a positive integer. The sum of the values of each group of three consecutive letters in the list is 35. If $q + u = 15$, then $p + q + r + s + t + u + v$ is

(A) 85   (B) 70   (C) 80   (D) 90   (E) 75

23. The net shown is folded to form a cube. An ant walks from face to face on the cube, visiting each face exactly once. For example, ABCFED and ABCEFD are two possible orders of faces the ant visits. If the ant starts at A, how many possible orders are there?
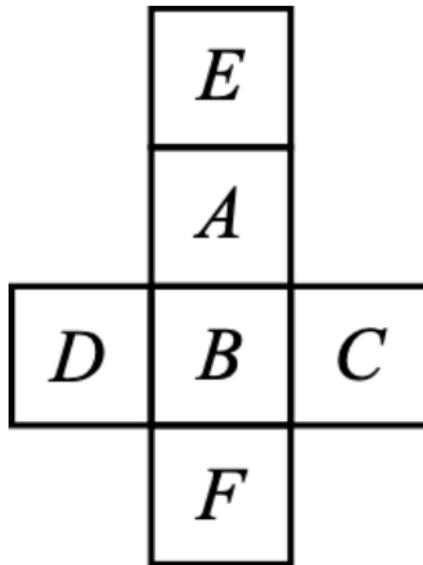
(A) 24   (B) 48   (C) 32   (D) 30   (E) 40

24. The number 385 is an example of a three-digit number for which one of the digits is the sum of the other two digits. How many numbers between 100 and 999 have this property?

(A) 144   (B) 126   (C) 108   (D) 234   (E) 64

25. Student A, Student B, and Student C have been hired to help scientists develop a new flavour of juice. There are 4200 samples to test. Each sample either contains blueberry or does not. Each student is asked to taste each sample and report whether or not they think it contains blueberry. Student A reports correctly on exactly 90% of the samples containing blueberry and reports correctly on exactly 88% of the samples that do not contain blueberry. The results for all three students are shown below. Student B reports 315 more samples as containing blueberry than Student A. For some positive integers m, the total number of samples that the three students report as containing blueberry is equal to a multiple of 5 between 8000 and 9000. The sum of all such values of m is

	Student A	Student B	Student C
Percentage correct on samples containing blueberry	90%	98%	$(2m)\%$
Percentage correct on samples not containing blueberry	88%	86%	$(4m)\%$

(A) 45   (B) 36   (C) 24   (D) 27   (E) 29