

Max 12	Max 24	
Stage Tot	Score	Marker

Put ID Sticker Here

# TARGET ROUND -- GRADE

# 5

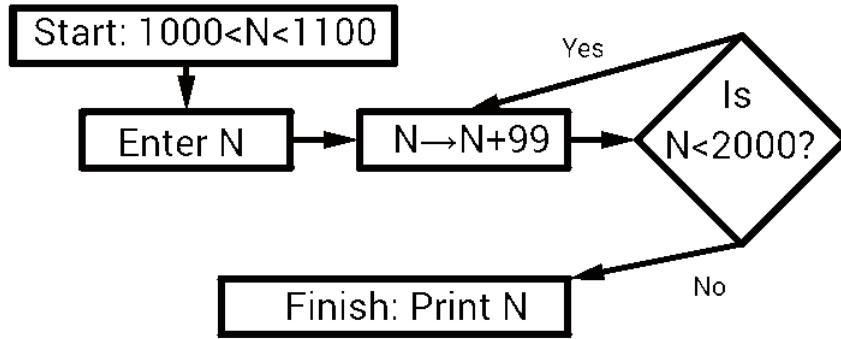
**NO Peeking: Wait for instructions to start!**

The region below is for the use of the markers

Max 4	Max 4	Max 4	Max 12	
Pr. 1-4	Pr. 5-8	Pr. 9-12	Stage Tot	Marker

1. At the start a whole number  $1000 < N < 1100$  was entered in the flow chart below. The value of  $N$  was changed according to the instructions, and at the finish, the printed value was  $N = 2023$ .

What was the value of  $N$  at the start?



\_\_\_\_\_ 1

2.  $\{1, 2, 3, 4, a, b, c\}$  is a set of 7 different numbers where 4 is the median value and all the 7 numbers are smaller than 20.

What is the largest possible average value of the numbers of this set?  
 Express your answer as a fraction in lowest terms.

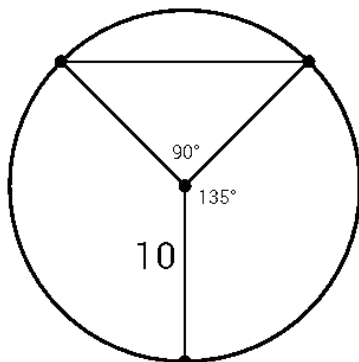
\_\_\_\_\_ 2

3. There is a pile of 7 cards numbered  $1, 2, 3, \dots, 7$  on the table. Gloria takes 3 different cards at random from the pile and writes down the sum of these 3 cards. What is the probability that the sum is odd?  
 Express the answer as a fraction in lowest terms.

\_\_\_\_\_ 3

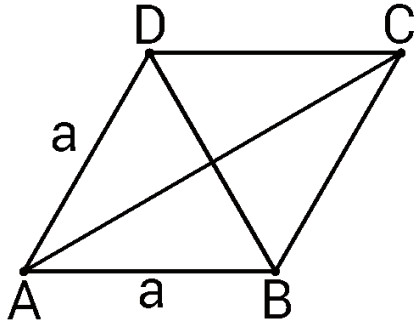
4. The shaded section of the circle of radius 10 consists of a right triangle and a sector of  $135^\circ$ . Find the area of the shaded section.

Use  $\pi = 3.14$ , and round your answer to the nearest whole number.



\_\_\_\_\_ 4

5. Below is a rhombus with sides  $a = 5$ . Its short diagonal satisfies  $BD = a = 5$ . What is the square value of the long diagonal, (i.e. the value of  $AC^2$ )?



\_\_\_\_\_ 5

6.  $N$  is a 6-digit number whose digits  $u, v, w, x, y, z$ , (not necessarily different), satisfy the condition  $u + v + w + x + y + z = M^2$ . If  $M$  is the largest such possible whole number, what is the smallest possible value of  $N$ ?

\_\_\_\_\_ 6

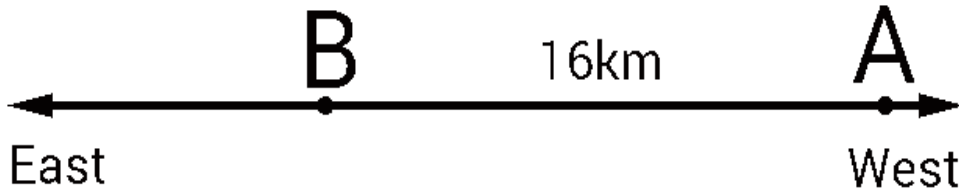
7. Two teams, A and B, compete in a basketball championship. The probability of Team A to win a game is 75%, and the probability of Team B to win a game is 25%, (no ties). The first team to win 3 games in total wins the championship. What is the probability that it will take only 3 games to decide the championship? Express the answer as a fraction in lowest terms.

\_\_\_\_\_ 7

8. What is the sum of all factors of 2023? Note that 1 and 2023 are factors of 2023. (Hint: 2023 is not a prime number).

\_\_\_\_\_ 8

9. Two cars,  $A$  and  $B$ , are  $16\text{km}$  apart. Both cars are driven East on a very long road. If car  $A$  is moving with speed  $92 \frac{\text{km}}{\text{h}}$  (kilometre per hour), and car  $B$  with speed  $80 \frac{\text{km}}{\text{h}}$ , (car  $A$  is located west of car  $B$ ), in how many minutes will the two cars meet?



\_\_\_\_\_ 9

10.  $N$  is the smallest positive whole number such that all the following conditions are satisfied:  $\{a, b, c, d, e, f\}$  is a set of 6 different primes,  $N = a + b + c = d + e + f$ ,  $a < b < c$ , and  $d < e < f$ . What is the maximum possible value of  $b - a$  ?

\_\_\_\_\_ 10

11. Jill drives a fuel-efficient car that consumes, on average, 6 litres of fuel per hour. When she started driving, the fuel tank was full. After driving  $T$  hours she stopped and added 10 litres of fuel so that the tank was 85% full. Then, she drove  $\frac{T}{2}$  hours, stopped again, and filled the tank with 17 more litres of fuel so that the fuel tank was full again. How many liters of fuel can a full tank hold? Round your answer to the nearest whole number.

\_\_\_\_\_ 11

12.  $L$ ,  $M$ , and  $N$ , are the values of the sides of a triangle, where  $0 < L < M < N < 10$  are all whole numbers. The perimeter of the triangle is  $P$ . How many different values of  $P$  are there?

\_\_\_\_\_ 12