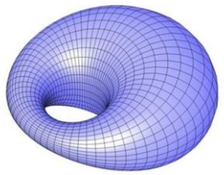
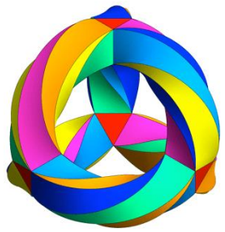
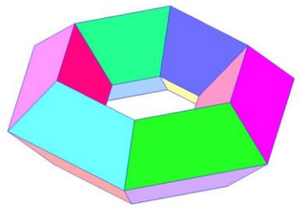
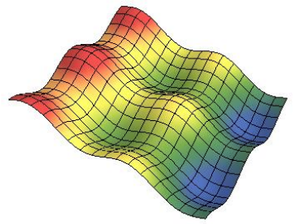
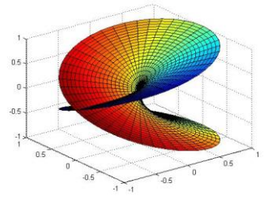
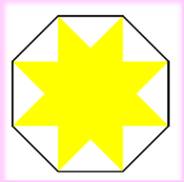
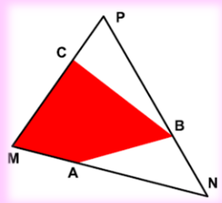
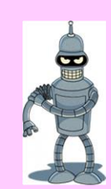
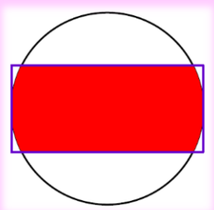
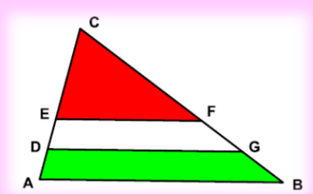
JANUARY

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUN.
					**1** How many numbers less than 100 are the product of three prime numbers?	**2**
3 In the figure there is a regular octagon with side 4 cm. Find the area of the octagonal star 	**4** A bag contains m white and n black balls. We draw a ball at random and return it by adding k balls of the same colour as the one drawn. We draw another ball at random, what is the probability that the second ball drawn is white?	**5** Calculate the sum of all the products of two different naturals taken from 1 to n.	**6** **7** Points A, B, and C in the figure divide each side of the triangle ΔMNP into two pieces that are in the ratio 1: 3. Find the fraction of the area of the triangle ΔMNP coloured red 		**8** For what values of x is the expression: $\frac{\sin^3 x \cdot \cos x}{1+\tan^2 x}$ reaches its highest value and what is this?	**9**
10 If $x^2 + x\cdot y + y^2 = 84$ $x - (x\cdot y)^{1/2} + y = 6$ calculate x·y	**11** The drawing shows a quadrant of radius s and two tangent semicircles. Find the radius of the small semicircle.	**12** In a right triangle, the bisector of an acute angle cuts the opposite leg into two pieces of length 1 and 2: What is the length of the bisector segment inside the triangle?	**13** Let us consider the naturals with nine figures. How many numbers do we have to extract to ensure that at least two of them have the same number in the tens of thousands?	**14** Solve **f(f(f(x))) = 0**, being: $f(x) = \begin{cases} x+4 & \text{sii } x \le -2 \\ -x & \text{sii } -2 < x < 0 \\ x & \text{sii } x \ge 0 \end{cases}$	**15** From the function f (x) it is known that it is periodic of period 5 and that in [3, 8 [verifies: **f(x) = x² – 10x + 25** Find f(2022)	**16** 
17 How many pairs of integers (x, y) with x ≤ y, verify that their product is equal to five times their sum?	**18** What is the remainder of the division of **P(x)=x²⁰⁰-2x¹⁹⁹+x²+x+1** between D(x)=x²-3x+2?	**19** There are ten consecutive naturals. The sum of nine of them gives 2022. What number have we not added?	**20** Points A and B are points on the graph of **y = x² – 7x – 1** Find the length of segment AB if (0, 0) is its midpoint	**21** 	**22** The circle and the rectangle in the figure have the same centre. The dimensions of the rectangle are 6x12 and the small sides of the rectangle are tangent to the circle, what is the area of the region common to the circle and the rectangle?	**23**
24/31 	**25** In the drawing EF // DG // AB. The shaded areas have the same area and CD = 4·DA Find the ratio between CE and EA	**26** Solve in $\mathbb{R}$ $x^2 + y^2 = \lvert x\rvert + \lvert y\rvert$	**27** If the quotient between the radius of the circular sector and the radius of the circle is three, what is the quotient between their areas?	**28** If the larger base of an isosceles trapezoid measures the same as the diagonal and the smaller base measures the same as the height of the trapezoid, find the ratio of the length of the smaller base to the length of the larger base.	**29** A square has one vertex at the point P (1, 2) and another on the line y = 3x + 4. What is the smallest possible value for its area?	**30**