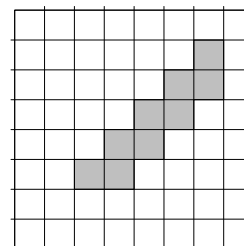


3 POINTS FOR EACH PROBLEM

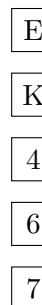
1. Which of the following products is the greatest?
 A) 2006×2006 B) 2005×2007 C) 2004×2008 D) 2003×2009 E) 2002×2010
2. With how many zeroes does the product of the first 2006 consecutive prime numbers end?
 A) None B) 1 C) 2 D) 9 E) 26

3. The perimeter of the shaded figure made out of 9 unit squares is equal to 20. What is the greatest number of squares we can connect to the shaded area so that the perimeter of the new figure would still be 20?



- A) 0 B) 7 C) 18 D) 12 E) 16

4. There are five cards on a table as shown in the picture. Every card has a letter on one side and a number on the other side. Jacob said, "Each card on the table that has a vowel on one side, has an even number on the other side." Alicia wants to find out if Jacob is saying the truth. What is the smallest number of cards that she must turn over to find out?

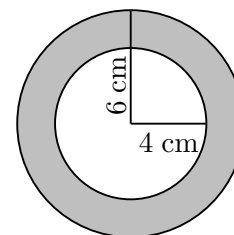


- A) 1 B) 2 C) 3 D) 4 E) 5

5. Two trains with the same length are traveling in opposite directions. The first train is traveling at 100 mi/h and the second one at 120 mi/h. A passenger of the second train observes that it takes the first train exactly 6 seconds to pass by completely. How many seconds does the passenger of the first train observe the first train passing by?

- A) 5 B) 6 C) 7 D) $7\frac{1}{5}$ E) Cannot be determined.

6. Martha has two pieces of jewelry made out of the same material. They are equally thick and weigh the same. The first one, shown in the picture, has a shape of a ring with two concentric circles with radii of 6 cm and 4 cm. The second one has a shape of a solid circle. How many centimeters long is the radius of the second piece of jewelry?



- A) 4 B) $2\sqrt{6}$ C) 5 D) $2\sqrt{5}$ E) $\sqrt{10}$

7. Numbers a , b , c , d and e form an arithmetic sequence. If $b = 5.5$ and $e = 10$, then what is the value of a ?

- A) 0.5 B) 3 C) 4 D) 4.5 E) 5

8. If $4^x = 9$ and $9^y = 256$, then xy is equal to:

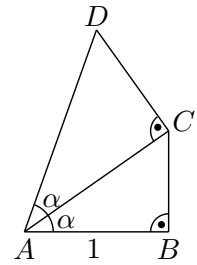
- A) 2006 B) 48 C) 36 D) 10 E) 4

9. Consider all of the 9-digit numbers made out of the digits from 1 to 9. If you write each number on a separate sheet of paper and put all the resulting sheets in a box, what is the least number of sheets that you must take out of the box to make sure that at least two of the picked numbers start with the same digit?

- A) 9! B) 8! C) 72 D) 10 E) 9

10. 10. In the diagram $|AB| = 1$; $\angle ABC = \angle ACD = 90^\circ$; $\angle CAB = \angle DAC = \alpha$. What is the length of AD ?

- A) $\cos \alpha + \tan \alpha$ B) $\frac{1}{\cos 2\alpha}$ C) $\cos^2 \alpha$ D) $\cos 2\alpha$ E) $\frac{1}{\cos^2 \alpha}$



4 POINTS FOR EACH PROBLEM

11. Which of the functions below has a graph symmetrical to Oy axis?

- A) $y = x^2 + x$ B) $y = x^2 \sin x$ C) $y = x \cos x$ D) $y = x \sin x$ E) $y = x^3$

12. The wheel of a fair roulette is divided into 37 identical spaces numbered from 0 to 36. What is the probability that the ball lands on a prime number?

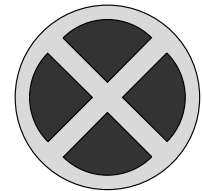
- A) $\frac{5}{18}$ B) $\frac{11}{36}$ C) $\frac{11}{37}$ D) $\frac{12}{37}$ E) $\frac{1}{3}$

13. When 1001 divided by a certain one-digit number, the remainder is 5. What is the remainder when the same one-digit number divides 2006?

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

14. The radius of a traffic sign is 20 inches. The area of the lighter region is equal to the area of the darker region. How many inches long is the radius of the circle made out of the four darker pieces?

- A) $10\sqrt{2}$ B) $4\sqrt{5}$ C) $\frac{20}{5}$ D) 12.5 E) 10

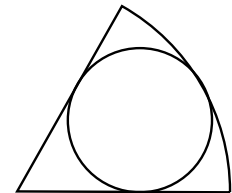


15. a , b and c are prime numbers. Let $a > b > c$. If $a + b + c = 78$ and $a - b - c = 40$ then abc equals:

- A) 438 B) 590 C) 1062 D) 1239 E) 2006

16. The ratio of the sector's radius to the inscribed circle's radius is 3:1. What is the ratio of their areas?

- A) 3 : 2 B) 4 : 3 C) $\sqrt{3} : 1$ D) 2 : 1 E) 9 : 1



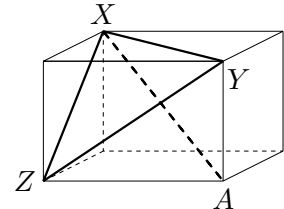
17. a and b are real numbers, greater than 1. Which of the following fractions has the greatest value?

- A) $\frac{a}{b-1}$ B) $\frac{a}{b+1}$ C) $\frac{2a}{2b+1}$ D) $\frac{2a}{2b-1}$ E) $\frac{3a}{3b+1}$

18. Last year, in the school choir, there were 30 more boys than girls. This year the number of choir members has increased by 10%; the number of girls has increased by 20% and the number of boys has increased by 5%. How many members does the choir have this year?

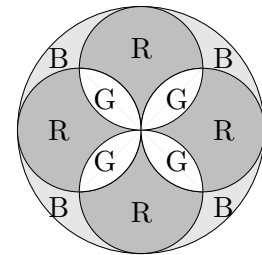
- A) 88 B) 99 C) 110 D) 121 E) 132

19. The picture illustrates a rectangular prism. The lengths of the prism's face diagonals are $|XZ| = \sqrt{55}$, $|XY| = 8$ and $|YZ| = 9$. What is the length of the prism's diagonal AX ?



- A) $\sqrt{90}$ B) 10 C) $\sqrt{120}$ D) 11 E) $10\sqrt{2}$

20. The picture illustrates a church stain glass. Letters R, G and B represent glass of red, green and blue color, respectively. The total area of green glass is 400 cm^2 . How many cm^2 does the area of the blue glass have?



- A) 120π B) $90\sqrt{2}\pi$ C) 382 D) 396 E) 400

5 POINTS FOR EACH PROBLEM

21. Sixteen teams played in *Math Kangaroo* league. Each team played one game against each other team. For each game the winning team got 1 point and the losing team 0 points. There were no ties. After playing all the games, the teams' scores formed an arithmetic sequence. How many points did the team in last place receive?

- A) The described situation is not possible. B) 1 C) 2 D) 3 E) Other number.

22. The cells of a 4×4 table are colored black and white as shown in Figure 1. One move allows us to exchange any two cells positioned in the same row or in the same column. What is the least number of moves necessary to obtain Figure 2?

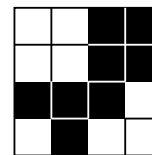


Figure 1
D) 4

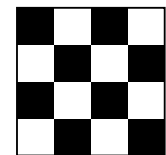


Figure 2
E) 5

- A) It is not possible. B) 2 C) 3

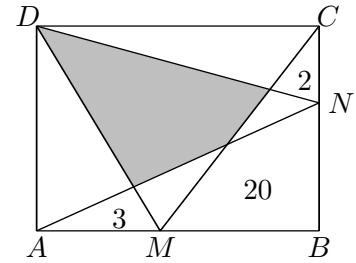
23. For how many values of real number b the solution for equation $x^2 - bx + 80 = 0$ are two different positive even integers?

- A) 0 B) 1 C) 2 D) 3 E) Infinitely many.

24. In how many non-empty subsets of set $\{1, 2, 3, \dots, 12\}$ is the sum of the largest element and the smallest element equal to 13?

- A) 1024 B) 1175 C) 1365 D) 1785 E) 4095

25. Segments starting with points M and N and ending with vertices of the rectangle $ABCD$ divide the figure into eight parts (see the figure). The areas of three parts of the rectangle are indicated in the picture. What is the area of the shaded region?



- A) 20 B) 21 C) 25 D) 26
 E) Cannot be determined.

26. For what value k , number

$$\sqrt{2 + \sqrt{3}} \cdot \sqrt{2 + \sqrt{2 + \sqrt{3}}} \cdot \sqrt{2 + \sqrt{2 + \sqrt{2 + \sqrt{3}}}} \cdot \sqrt{2 - \sqrt{2 + \sqrt{2 + \sqrt{3}}}}$$

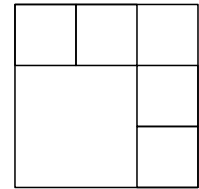
is the solution for equation: $3x^4 + 5x + 2k = 0$?

- A) -5 B) -4 C) 0 D) 2 E) 5

27. Paul removed one number from the sequence of ten consecutive natural numbers. The sum of the remaining nine numbers is 2006. What number did Paul remove?

- A) 218 B) 219 C) 220 D) 225 E) 227

28. In how many ways can numbers 1, 2, 3, 4, 5 and 6 be written in the squares of the figure (one in each square) so that there are no adjacent squares in which the difference of the numbers written is equal to 3? (Squares that share only a corner are not considered adjacent.)

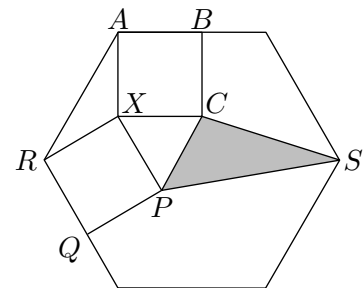


- A) $3 \cdot 2^5$ B) 3^6 C) 6^3 D) $2 \cdot 3^5$ E) $3 \cdot 5^2$

29. What is the least possible value of $21x + 14y$, if $xy = 6$ and $y > 0$?

- A) 48 B) 83.5 C) 84 D) 96 E) 78

30. The picture illustrates regular hexagon with the side's length equal to $\sqrt{3}$. Quadrilaterals $XABC$ and $QPXR$ are squares. What is the area of shaded triangle CPS ?



- A) $\frac{5 - \sqrt{3}}{4}$ B) $\frac{\sqrt{3} + 1}{2}$ C) $\frac{\sqrt{3}}{4}$ D) $\frac{2 - \sqrt{3}}{4}$ E) $\frac{2 + \sqrt{3}}{4}$