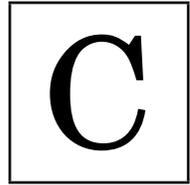


# KANGAROO 2016



Time allowed: 75 minutes  
Calculators are not permitted

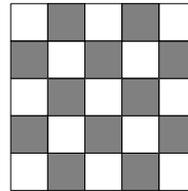
Cadet  
7–8 grades

24. Little Red Riding Hood is delivering waffles to three grannies. She starts with a basket full of waffles. Just before she enters each of the grannies' houses, the Big Bad Wolf eats half of the waffles in her basket. When she leaves the third granny's house, she has no waffles left. She delivers the same number of waffles to each granny. Which of the following numbers definitely divides the number of waffles she started with?  
A) 4 B) 5 C) 6 D) 7 E) 9

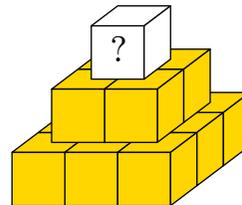
25. A positive integer is called suspicious if the sum of its digits is greater than the product of its digits. What is the total number of suspicious two-digit positive integers?  
A) 13 B) 26 C) 39 D) 44 E) 79

26. Several different positive integers are written on a blackboard. The product of the smallest two of them is 16. The product of the largest two is 225. What is the sum of all the integers?  
A) 38 B) 42 C) 44 D) 58 E) 243

27. A  $5 \times 5$  square is divided into 25 cells. Initially all its cells are white. Neighbouring cells are those that share a common edge. On each move two neighbouring cells have their colours changed to the opposite colour (e.g. white cells become black and black ones become white). What is the minimum number of moves required in order to obtain the chess-like colouring shown on the right?  
A) 11 B) 12 C) 13 D) 14 E) 15

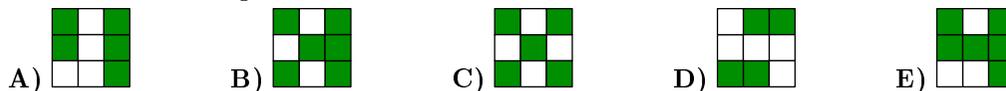


28. Katie writes a different positive integer on each of the fourteen cubes in the pyramid. The sum of the nine integers written on the bottom cubes is equal to 50. The integer written on each other cube is equal to the sum of the integers written on the four cubes underneath it. What is the greatest possible integer that can be written on the top cube?  
A) 98 B) 104 C) 110 D) 118 E) 120



29. A train has five carriages, each containing at least one passenger. Two passengers are said to be "neighbours" if either they are in the same carriage or they are in two adjacent carriages. Each passenger has either exactly five or exactly ten "neighbours". How many passengers are there in the train?  
A) 13 B) 15 C) 17 D) 20 E) There is more than one possibility

30. A  $3 \times 3 \times 3$  cube is built from 15 black cubes and 12 white cubes. Five faces of the larger cube are shown. Which of the following is the sixth face of the large cube?



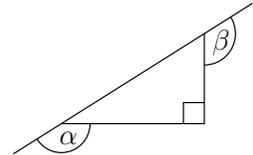
## Questions for 3 points

1. How many whole numbers are there between 3.17 and 20.16?  
A) 15 B) 16 C) 17 D) 18 E) 19

2. Which of the following traffic signs has the largest number of axes of symmetry?

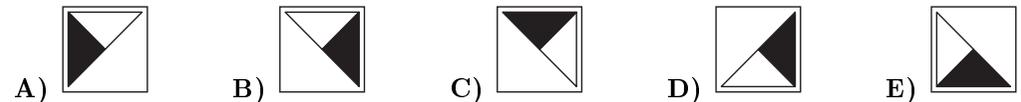
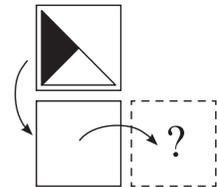


3. What is the sum of the two marked angles  $\alpha$  and  $\beta$ ?  
A)  $150^\circ$  B)  $180^\circ$  C)  $270^\circ$  D)  $320^\circ$  E)  $360^\circ$



4. Jenny had to add 26 to a certain number. Instead she subtracted 26 and obtained  $-14$ . What number should she have obtained?  
A) 28 B) 32 C) 36 D) 38 E) 42

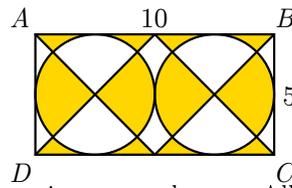
5. Joanna turns a card over about its lower edge and then about its right-hand edge, as shown. What does she see?



6. Kanga combines 555 groups of 9 stones into a single pile. She then splits the resulting pile into groups of 5 stones. How many groups does she get?  
A) 999 B) 900 C) 555 D) 111 E) 45

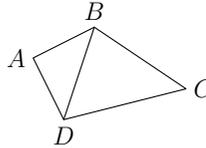
7. In my school, 60% of the teachers get to school by bike, which is 45 teachers. Only 12% of the teachers use their car to get to school. How many teachers use their car to get to school?  
A) 4 B) 6 C) 9 D) 10 E) 12

8. What is the shaded area?  
 A) 12.5 B) 20 C) 25 D) 30 E) 37.5



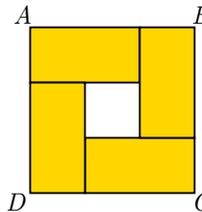
9. Two pieces of rope have length 1 m and 2 m. Alex cuts the pieces into several parts. All the parts have equal length. Which of the following could not be the total number of parts he obtains?  
 A) 6 B) 8 C) 9 D) 12 E) 15

10. Four towns  $A$ ,  $B$ ,  $C$  and  $D$  are connected by roads, as shown. A race uses each road exactly once. The race starts at  $B$  and finishes at  $D$ . How many possible routes are there for the race?  
 A) 10 B) 8 C) 6 D) 4 E) 2



**Questions for 4 points**

11. The diagram shows four identical rectangles placed inside a square  $ABCD$ . The perimeter of each rectangle is 16. What is the perimeter of the square  $ABCD$ ?  
 A) 16 B) 20 C) 24 D) 28 E) 32



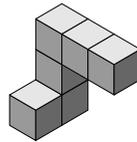
12. Petra has 49 blue beads and one red bead. How many beads must Petra remove so that 90% of her beads are blue?  
 A) 4 B) 10 C) 29 D) 39 E) 40

13. Which of the following fractions has a value closest to  $\frac{1}{2}$ ?

- A)  $\frac{25}{79}$  B)  $\frac{27}{59}$  C)  $\frac{29}{57}$  D)  $\frac{52}{79}$  E)  $\frac{57}{92}$

14. Ivor writes down the results of the quarter-finals, the semi-finals and the final of a knock-out tournament. The results are (not necessarily in this order): Bart beat Antony, Carl beat Damien, Glen beat Henry, Glen beat Carl, Carl beat Bart, Ed beat Fred and Glen beat Ed. Which pair played in the final?  
 A) Glen and Henry B) Glen and Carl C) Carl and Bart D) Glen and Ed E) Carl and Damien

15. Anne has glued some cubes together, as shown. She rotates the solid to look at it from different angles. Which of the following can she not see?



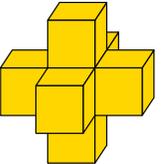
- A) B) C) D) E)

16. Tim, Tom and Jim are triplets (three brothers born on the same day). Their twin brothers John and James are 3 years younger. Which of the following numbers could be the sum of the ages of the five brothers?  
 A) 36 B) 53 C) 76 D) 89 E) 92

17. What is the last digit of the number  $2^{2016} + 2016^2$ ?  
 A) 0 B) 2 C) 4 D) 6 E) 8

18. Two kangaroos Jum and Per start to jump at the same time, from the same point, in the same direction. After that, they make one jump per second. Each of Jum's jumps is 6 m in length. Per's first jump is 1 m in length, the second is 2 m, the third is 3 m, and so on. After how many jumps does Per catch Jum?  
 A) 10 B) 11 C) 12 D) 13 E) 14

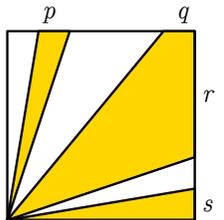
19. Seven standard dice are glued together to make the solid shown. The faces of the dice that are glued together have the same number of dots on them. How many dots are on the surface of the solid?  
 A) 24 B) 90 C) 95 D) 105 E) 126



20. There are 20 students in a class. They sit in pairs so that exactly one third of the boys sits with a girl, and exactly one half of the girls sits with a boy. How many boys are there in the class?  
 A) 9 B) 12 C) 15 D) 16 E) 18

**Questions for 5 points**

21. Inside a square of area 36, there are shaded regions as shown. The total shaded area is 27. What is  $p + q + r + s$ ?  
 A) 4 B) 6 C) 8 D) 9 E) 10



22. Theo's watch is 10 minutes slow, but he believes that it is 5 minutes fast. Leo's watch is 5 minutes fast, but he believes that it is 10 minutes slow. At the same moment, each of them looks at his own watch. Theo thinks it is 12:00. What time does Leo think it is?  
 A) 11:30 B) 11:45 C) 12:00 D) 12:30 E) 12:45

23. Twelve girls met in a café. On average, they ate 1.5 cup-cakes. None of them ate more than two cup-cakes and two of them had only mineral water. How many girls ate two cup-cakes?  
 A) 2 B) 5 C) 6 D) 7 E) 8