24. Liz and Mary compete in solving problems. Each of them is given the same list of 100 problems. For any problem, the first of them to solve it gets 4 points, while the second to solve it gets 1 point. Liz solved 60 problems, and Mary also solved 60 problems. Together, they got 312 points. How many problems were solved by both of them?
A) 53 **B)** 54 **C)** 55 **D)** 56 **E)** 57

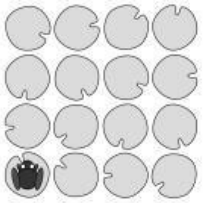
25. David rides his bicycle from Edinburgh to his croft. He was going to arrive at 15:00, but he spent $\frac{2}{3}$ of the planned time covering $\frac{3}{4}$ of the distance. After that, he rode more slowly and arrived exactly on time. What is the ratio of the speed for the first part of the journey to the speed for the second part?
A) 5 : 4 **B)** 4 : 3 **C)** 3 : 2 **D)** 2 : 1 **E)** 3 : 1

26. The angle A of a triangle ABC equals 45°. The points P, Q and R are selected on the edges AB, BC and CA, respectively, so that $BQ = PQ$ and $CQ = QR$. What is the angle PQR?
A) 60° **B)** 75° **C)** 90° **D)** 105° **E)** It depends on Q

27. A group of 25 people consists of knights, serfs and damsels. Each knight always tells the truth, each serf always lies, and each damsel alternates between telling the truth and lying. When each of them was asked: "Are you a knight?", 17 of them said "Yes". When each of them was then asked: "Are you a damsel?", 12 of them said "Yes". When each of them was then asked: "Are you a serf?", 8 of them said "Yes". How many knights are in the group?
A) 4 **B)** 5 **C)** 9 **D)** 13 **E)** 17

28. Several different positive integers are written on the board. Exactly two of them are divisible by 2 and exactly 13 of them are divisible by 13. Let M be the greatest of these numbers. What is the smallest possible value of M?
A) 169 **B)** 260 **C)** 273 **D)** 299 **E)** 325

29. On a pond there are 16 water lily leaves in a 4 by 4 pattern as shown. A frog sits on a leaf in one of the corners. It then jumps from one leaf to another either horizontally or vertically. The frog always jumps over at least one leaf and never lands on the same leaf twice. What is the greatest number of leaves (including the one it sits on) that the frog can reach?
A) 16 **B)** 15 **C)** 14 **D)** 13 **E)** 12



30. A 5×5 square is made from 1×1 tiles, all with the same pattern, as shown. Any two adjacent tiles have the same colour along the shared edge. What is the smallest possible number of black unit segments in the perimeter of the 5×5 square?
A) 4 **B)** 5 **C)** 6 **D)** 7 **E)** 8



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KANGAROO 2014

C

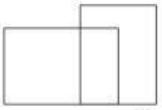
Time allowed: 75 minutes
Calculators are not permitted

Cadet
7–8 grades

Questions for 3 points

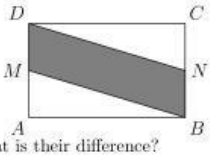
1. Each year, the date of the Kangaroo competition is the third Thursday of March. What is the latest possible date of the competition in any year?
A) 14th March **B)** 15th March **C)** 20th March **D)** 21st March **E)** 22nd March

2. How many quadrilaterals of any size can we see in the figure?
A) 0 **B)** 1 **C)** 2 **D)** 4 **E)** 5



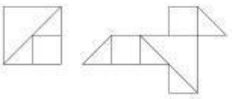
3. What is the result of $\dfrac{2014 \cdot 2014}{2014} - 2014$?
A) 0 **B)** 1 **C)** 2013 **D)** 2014 **E)** 4028

4. The area of rectangle $ABCD$ is 10. Points M and N are midpoints of the sides AD and BC. What is the area of quadrilateral $MBND$?
A) 0.5 **B)** 2.5 **C)** 5 **D)** 7.5 **E)** 10



5. The product of two numbers is 10 and their sum is 11. What is their difference?
A) 1 **B)** 3 **C)** 5 **D)** 7 **E)** 9

6. Wanda has several square pieces of paper of area 4. She cuts them into squares and right-angled triangles in the manner shown in the first diagram. She takes some of the pieces and makes the bird shown in the second diagram. What is the area of the bird?
A) 3 **B)** 4 **C)** 4.5 **D)** 5 **E)** 6



7. A bucket was half full. A cleaner added 2 litres to the bucket. The bucket was then three-quarters full. What is the capacity of the bucket?
A) 2 l **B)** 4 l **C)** 6 l **D)** 8 l **E)** 10 l

8. Georg built the shape shown using seven unit cubes. How many such cubes does he have to add to make a cube with edges of length 3?
A) 12 **B)** 14 **C)** 16 **D)** 18 **E)** 20



LIVEWORKSHEETS

9. Which of the following calculations gives the largest result?
A) 44×777 **B)** 55×666 **C)** 77×444 **D)** 88×333 **E)** 99×222

10. The necklace in the picture contains grey beads and white beads. Arno takes one bead after another from the necklace. He always takes a bead from one of the ends. He stops as soon as he has taken the fifth grey bead. What is the largest number of white beads that Arno can take?

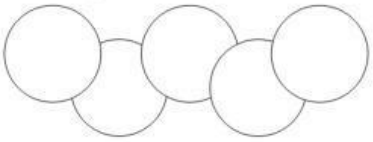


A) 4 **B)** 5 **C)** 6 **D)** 7 **E)** 8

Questions for 4 points

11. Jack has a piano lesson twice a week and Hannah has a piano lesson every other week. In a given term, Jack has 15 more lessons than Hannah. How many weeks long is their term?
A) 30 **B)** 25 **C)** 20 **D)** 15 **E)** 10

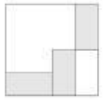
12. In the diagram, the area of each circle is 1. The area common to two overlapping circles is $\frac{1}{8}$. What is the area of the region covered by the five circles?



A) 4 **B)** $\frac{9}{2}$ **C)** $\frac{35}{8}$ **D)** $\frac{39}{8}$ **E)** $\frac{19}{4}$

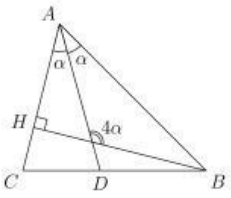
13. This year a grandmother, her daughter and her granddaughter noticed that the sum of their ages is 100 years. Each of their ages is a power of 2. How old is the granddaughter?
A) 2 **B)** 4 **C)** 8 **D)** 16 **E)** 32

14. Three equal rectangles are placed inside a square with side 24 cm, as shown in the diagram. What is the area of one rectangle?
A) 24 cm^2 **B)** 32 cm^2 **C)** 36 cm^2 **D)** 48 cm^2 **E)** 72 cm^2



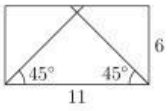
15. Which of the following numbers is four times less than its inverse?
A) $\frac{1}{4}$ **B)** $\frac{1}{2}$ **C)** 1 **D)** 2 **E)** 4

16. The diagram shows the triangle ABC in which BH is a perpendicular height and AD is the angle bisector at A. The obtuse angle between BH and AD is four times the angle DAB (see the diagram). What is the angle CAB?
A) 30° **B)** 45° **C)** 60° **D)** 75° **E)** 90°



17. Six boys share a flat with two bathrooms which they use every morning beginning at 7:00 o'clock. There is never more than one person in either bathroom at any one time They spend 8, 10, 12, 17, 21 and 22 minutes at a stretch in the bathroom respectively. What is the earliest time that they can finish using the bathrooms?
A) 7:45 **B)** 7:46 **C)** 7:47 **D)** 7:48 **E)** 7:50

18. A rectangle has sides of length 6 and 11. One long side is selected. The bisectors of the angles at either end of that side are drawn. These bisectors divide the other long side into three parts. What is the length of the middle part?
A) 1 **B)** 2 **C)** 3 **D)** 4 **E)** 5



19. A pirate crew dug up several gold coins. They divide the coins amongst themselves so that each person gets the same number of coins. If there were four fewer pirates, then each person would get 10 more coins. However, if there were 50 fewer coins, then each person would get 5 fewer coins. How many coins did they dig up?
A) 80 **B)** 100 **C)** 120 **D)** 150 **E)** 250

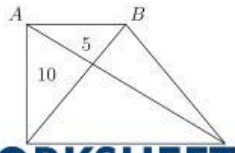
20. The average of two positive numbers is 30% less than one of them. By what percentage is the average greater than the other number?
A) 75% **B)** 70% **C)** 30% **D)** 25% **E)** 20%

Questions for 5 points

21. The number 2814 is represented as a product of two 2-digit positive integer numbers. What is the sum of these numbers?
A) 42 **B)** 107 **C)** 79 **D)** 133 **E)** 109

22. An antique scale is not working properly. If something is lighter than 1000 g, the scale shows the correct weight. However, if something is heavier than or equal to 1000 g, the scale can show any number above 1000 g. We have 5 weights A g, B g, C g, D g, E g each under 1000 g. When they are weighed in pairs, the scale shows the following: $B + D = 1200$, $C + E = 2100$, $B + E = 800$, $B + C = 900$, $A + E = 700$. Which of the weights is the heaviest?
A) A **B)** B **C)** C **D)** D **E)** E

23. Quadrilateral $ABCD$ has right angles only at vertices A and D. The numbers show the areas of two of the triangles. What is the area of $ABCD$?
A) 60 **B)** 45 **C)** 40 **D)** 35 **E)** 30



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