25. A soccer ball is made of white hexagons and black pentagons, as seen in the picture. There are a total of 12 pentagons. How many hexagons are there?

(A) 12 (B) 15 (C) 18 (D) 20 (E) 24

26. 2021 coloured kangaroos are arranged in a row and are numbered from 1 to 2021. Each kangaroo is coloured either red, grey or blue. Amongst any three consecutive kangaroos, there are always kangaroos of all three colours. Bruce guesses the colours of five kangaroos. These are his guesses: Kangaroo 2 is grey; Kangaroo 20 is blue; Kangaroo 202 is red; Kangaroo 1002 is blue; Kangaroo 2021 is grey. Only one of his guesses is wrong. What is the number of the kangaroo whose colour he guessed incorrectly?

(A) 2 (B) 20 (C) 202 (D) 1002 (E) 2021

27. A $3 \times 4 \times 5$ cuboid consists of 60 identical small cubes. A termite eats its way along the diagonal from P to Q. This diagonal does not intersect the edges of any small cube inside the cuboid. How many of the small cubes does it pass through on its journey?
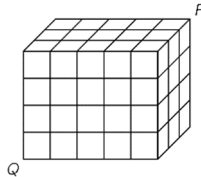
(A) 8 (B) 9 (C) 10 (D) 11 (E) 12

28. In a town there are 21 knights who always tell the truth and 2000 knaves who always lie. A wizard divided 2020 of these 2021 people into 1010 pairs. Every person in a pair described the other person as either a knight or a knave. As a result, 2000 people were called knights and 20 people were called knaves. How many pairs of two knaves were there?

(A) 980 (B) 985 (C) 990 (D) 995 (E) 1000

29. In a tournament each of the six teams plays one match against every other team. In each round of matches, three take place simultaneously. A TV station has already decided which match it will broadcast for each round, as shown in the diagram. In which round will team D play against team F?

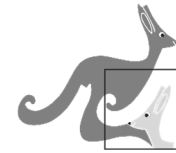| 1	2	3	4	5
A–B	C–D	A–E	E–F	A–C

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

30. The diagram shows a quadrilateral divided into four smaller quadrilaterals with a common vertex K. The other labelled points divide the sides of the large quadrilateral into three equal parts. The numbers indicate the areas of the corresponding small quadrilaterals. What is the area of the shaded quadrilateral?
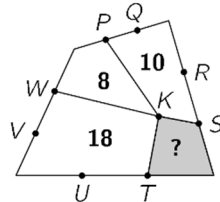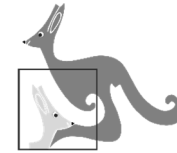
(A) 4 (B) 5 (C) 6 (D) 6.5 (E) 7
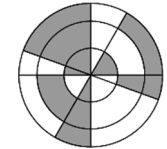
Laiks uzdevumu risināšanai – 75 minūtes!

3 point problems

1. Which of the following symbols for signs of the Zodiac has an axis of symmetry?

(A) Sagittarius (B) Scorpio (C) Leo (D) Cancer (E) Capricorn

2. The figure shows three concentric circles with four lines passing through their common centre. What percentage of the figure is shaded?

(A) 30% (B) 35% (C) 40% (D) 45% (E) 50%

3. What is the value of $\dfrac{20 \cdot 21}{2+0+2+1}$?

(A) 42 (B) 64 (C) 80 (D) 84 (E) 105

4. How many four-digit numbers have the property that their digits, from left to right, are consecutive and in ascending order?

(A) 5 (B) 6 (C) 7 (D) 8 (E) 9

5. When the five pieces shown are fitted together correctly, the result is a rectangle with a calculation written on it. What is the answer to this calculation?

(A) −100 (B) −8 (C) −1 (D) 199 (E) 208

6. Each of the five vases shown has the same height and each has a volume of 1 litre. Half a litre of water is poured into each vase. In which vase would the level of the water be the highest?
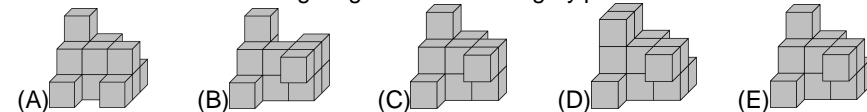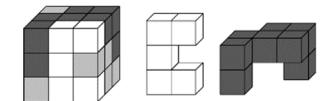
(A) (B) (C) (D) (E)
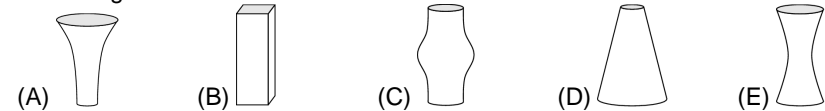
7. A student correctly added the two two-digit numbers on the left of the board and got the answer 137. What answer will he get if he adds the two four-digit numbers on the right of the board?

$$\begin{array}{r} AB \\ + \ CD \\ \hline 137 \end{array} \qquad \begin{array}{r} ADCB \\ + \ CBAD \\ \hline ? \end{array}$$

(A) 13737 (B) 13837 (C) 14747 (D) 23737 (E) 137137

8. A $3 \times 3 \times 3$ cube is made from white, grey and black $1 \times 1 \times 1$ cubes, as shown in the first diagram. The other two diagrams show the white part and the black part of the cube. Which of the following diagrams shows the grey part?

(A) (B) (C) (D) (E)

9. A bike lock has four wheels numbered with the digits 0 to 9 in order. Each of the four wheels is rotated by 180° from the code shown in the first diagram to get the correct code. What is the correct code for the bike lock?

6348 ⟲180°

(A) **0815** (B) **1893** (C) **1972** (D) **4892** (E) **8436**

10. Byron is 5cm taller than Aaron, but 10cm shorter than Caron. Darren is 10cm taller than Caron, but 5cm shorter than Erin. Which of the following statements is true?
(A) Aaron and Erin are equal heights
(B) Aaron is 10cm taller than Erin
(C) Aaron is 10cm shorter than Erin
(D) Aaron is 30cm taller than Erin
(E) Aaron is 30cm shorter than Erin

4 point problems

11. A rectangular chocolate bar is made of equal squares. Neil breaks off two complete strips of squares and eats the 12 squares he obtains. Later, Jack breaks off one complete strip of squares from the same bar and eats the 9 squares he obtains. How many squares of chocolate are left in the bar?
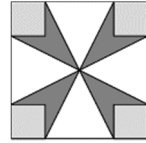(A) 72　　(B) 63　　(C) 54　　(D) 45　　(E) 36

12. A jar one fifth filled with water weighs 560 g. The same jar four fifths filled with water weighs 740 g. What is the weight of the empty jar?
(A) 60 g　　(B) 112 g　　(C) 180 g　　(D) 300 g　　(E) 500 g

13. The area of the large square is 16 cm² and the area of each small square is 1 cm². What is the total area of the dark grey flower?
(A) 3 cm²　　(B) $\frac{7}{2}$ см²　　(C) 4 см²　　(D) $\frac{11}{2}$ см²　　(E) 6 см²

14. Costa is building a new fence in his garden. He uses 25 planks of wood, each of which are 30 cm long. He arranges these planks so that there is the same slight overlap between any two adjacent planks. The total length of Costa's new fence is 6.9 meters. What is the length in centimetres of the overlap between any pair of adjacent planks?
(A) 2.4　　(B) 2.5　　(C) 3　　(D) 4.8　　(E) 5

15. Five identical right-angled triangles can be arranged so that their larger acute angles touch to form the star shown in the diagram. It is also possible to form a different star by arranging more of these triangles so that their smaller acute angles touch. How many triangles are needed to form the second star?
(A) 10　　(B) 12　　(C) 18　　(D) 20　　(E) 24

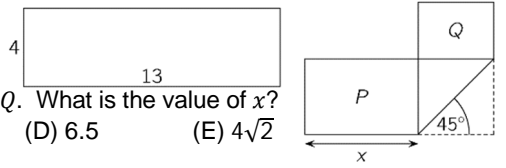16. Five squares are positioned as shown. The small square indicated has area 1. What is the value of h?
(A)3　　(B)3.5　　(C)4　　(D)4.2　　(E)4.5
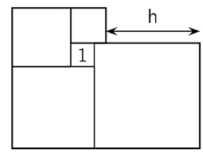
17. There are 20 questions in a quiz. Each correct answer scores 7 points, each wrong answer scores −4 points, and each question left blank scores 0 points. Eric took the quiz and scored 100 points. How many questions did he leave blank?
(A) 0　　(B) 1　　(C) 2　　(D) 3　　(E) 4

18. A rectangular strip of paper of dimensions 4×13 is folded as shown in the diagram. Two rectangles are formed with areas P and Q where $P = 2Q$. What is the value of x?
(A) 5　　(B) 5.5　　(C) 6　　(D) 6.5　　(E) $4\sqrt{2}$

19. A box of fruit contains twice as many apples as pears. Christy and Lily divided them up so that Christy had twice as many pieces of fruit as Lily. Which one of the following statements is always true?
(A) Christy took at least one pear.
(B) Christy took twice as many apples as pears.
(C) Christy took twice as many apples as Lily.
(D) Christy took as many apples as Lily got pears.
(E) Christy took as many pears as Lily got apples.
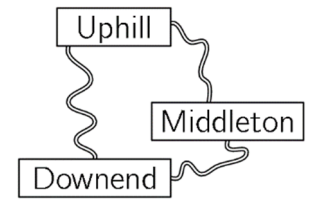
20. Three villages are connected by paths as shown. From Downend to Uphill, the detour via Middleton is 1km longer than the direct path. From Downend to Middleton, the detour via Uphill is 5km longer than the direct path. From Uphill to Middleton, the detour via Downend is 7km longer than the direct path. How long is the shortest of the three direct paths between the villages?
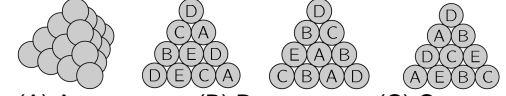(A) 1km　　(B) 2km　　(C) 3km　　(D) 4km　　(E) 5km

5 point problems

21. In a particular fraction the numerator and denominator are both positive. The numerator of this fraction is increased by 40%. By what percentage should its denominator be decreased so that the new fraction is double the original fraction?
(A) 10%　　(B) 20%　　(C) 30%　　(D) 40%　　(E) 50%

22. A triangular pyramid is built with 20 cannon balls, as shown. Each cannon ball is labelled with one of A, B, C, D or E. There are four cannon balls with each type of label. The picture shows the labels on the cannon balls on three of the faces of the pyramid. What is the label on the hidden cannon ball in the middle of the fourth face?
(A) A　　(B) B　　(C) C　　(D) D　　(E) E

23. The 6-digit number $2ABCDE$ is multiplied by 3 and the result is the 6-digit number $ABCDE2$. What is the sum of the digits of this number?
(A) 24　　(B) 27　　(C) 30　　(D) 33　　(E) 36

24. A box contains only green, red, blue and yellow counters. There is always at least one green counter amongst any 27 counters chosen from the box; always at least one red counter amongst any 25 counters chosen; always at least one blue amongst any 22 counters chosen and always at least one yellow amongst any 17 counters chosen. What is the largest number of counters that could be in the box?
(A) 27　　(B) 29　　(C) 51　　(D) 87　　(E) 91