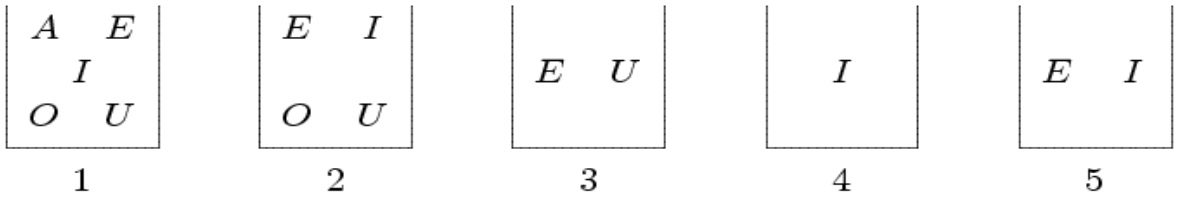
3 points

1)

There are 5 boxes and each box contains some cards labelled A, E, I, O, U as shown. Peter wants to remove cards from each box in such a way that at the end each box contains only one card, and different boxes contain cards with different letters. What card remains in box 2?



A) A B) E C) I D) O E) U

2)

Frank and Gabriel did compete in running on 200 meters. Gabriel did it under half of the minute, but Frank did it under the hundredth part of one hour. Who and by how many seconds was faster?

A) Gabriel by 36 seconds
B) Frank by 24 seconds
C) Gabriel by 6 seconds
D) Frank by 4 seconds
E) They did it by equal time

3)

To greet the New Year day 2008, Basil put on a T-shirt with

on it, and stood in front of a mirror on his hands, with his feet up. What was seen in the mirror by his friend Nick, who stood (on this feet) beside Basil?

A) B) C) D) E)

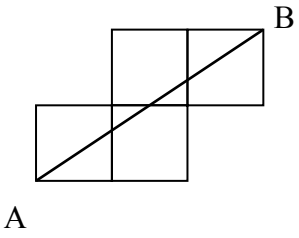
4) $a = 2-(-4)$, $b = (-2)(-3)$, $c = 2-8$, $d = 0-(-6)$ **and** $e = (-12):(-2)$

How many of these results are not equal to 6?

A) 0 B) 1 C) 2 D) 4 E) 5

5)

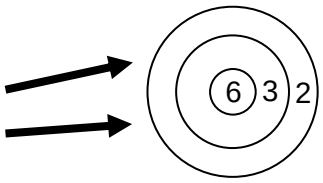
What is the length of line AB if the side of each of the three squares shown is 1m?



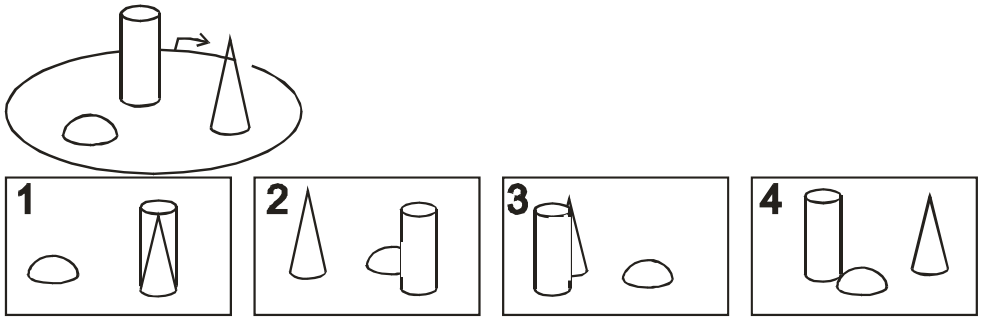
A) 5 B) $\sqrt{13}$ C) $\sqrt{5}+\sqrt{2}$
D) $\sqrt{5}$ E) none of the previous

6) By shooting two arrows at the shown aiming board on the wall,
how many different scores can we obtained? (Missing the board is possible.)

A) 4 B) 6 C) 8
D) 9 E) 10



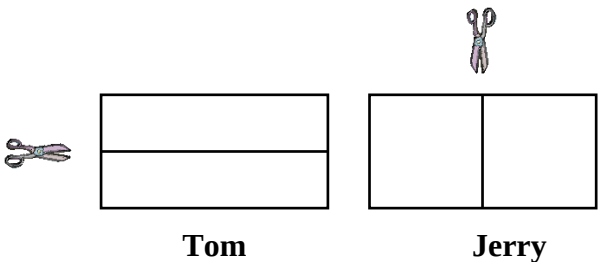
7) Betty walked once around the park, starting from the marked point in direction of the arrow. She made 4 photos. In which order did she make the photos?



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

8)

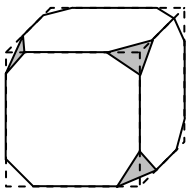
Tom and Jerry cut two equal rectangles. Tom got two rectangles with the perimeter of 50 cm each, and Jerry got two rectangles with the perimeter of 40 cm each. What were the perimeters of the initial rectangles?



A) 40 cm B) 50 cm C) 60 cm D) 80 cm E) 90 cm

9)

A cube has all its corners cut off, as shown. How many edges does the resulting shape have?



A) 26 B) 30 C) 36 D) 40
E) another answer

10)

In his first mathematics test, Nicos answered only 1 question out of 5. In additional test he answered all 5 questions. At the end he measured that he has answered an average of 4 questions out of 5. How many were the tests?

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

4 points

11)

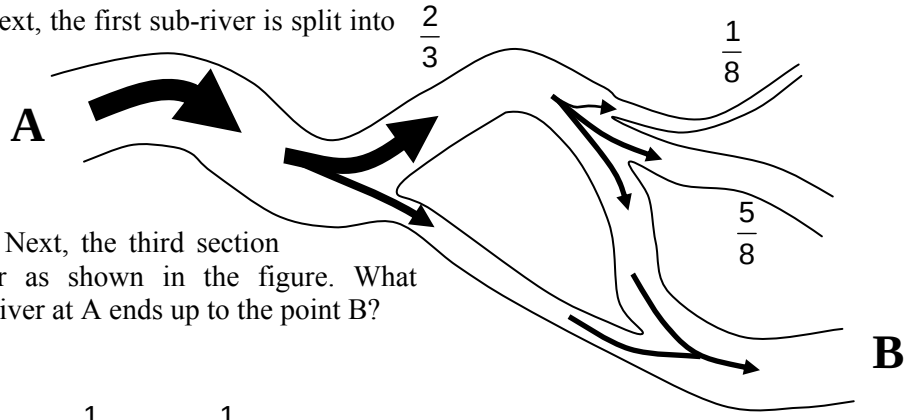
Seven cards lie in a box. Numbers from 1 to 7 are written on these cards (exactly one number on the card). The first sage takes, at random, 3 cards from the box and the second sage takes 2 cards (2 cards are left in the box). Then the first sage tells to the second one: "I know that the sum of the numbers of your cards is even". The sum of card's numbers of the first sage is equal to

A) 10 B) 12 C) 6 D) 9 E) 15

12) We have the seven numbers: 1, 3, 5, 6, 7, 11 and 13. John took six of these numbers and he distributed them to two groups such that the sum of the numbers in one group is equal to the sum of the numbers in the other group. Which number is the seventh that John did not use?

A) 1 B) 3 C) 5 D) 6 E) 13

13) A river begins at point A. The river splits in two. One sub-river takes the $\frac{2}{3}$ of the river water and the second sub-river takes the rest. Next, the first sub-river is split into 3 and one of the sections takes the $\frac{1}{8}$ of the water of the sub-river, the second section takes the $\frac{5}{8}$ of the sub-river and the third the rest. Next, the third section meets another section of the river as shown in the figure. What proportion of the initial water of the river at A ends up to the point B?



A) $\frac{1}{3}$ B) $\frac{5}{4}$ C) $\frac{2}{9}$ D) $\frac{1}{2}$ E) $\frac{1}{4}$

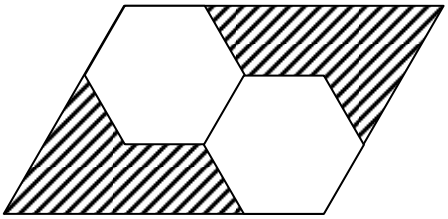
14)

The 7 dwarfs were born on the same day, in 7 consecutive years. The 3 youngest of them are 42 years old together. How many years old are the 3 oldest together?

A) 51 B) 54 C) 57 D) 60 E) 63

15)

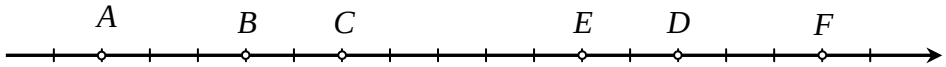
In the figure the two regular hexagons are equal to each other. What fraction of the parallelogram's area is shaded?



A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{2}{3}$ D) $\frac{2}{5}$ E) $\frac{5}{12}$

16)

Six integers are marked on the real line (see the fig.). It is known that at least two of them are divided by 3, and at least two of them are divided by 5. Which numbers are divided by 15?



A) *A* and *F* B) *B* and *D* C) *C* and *E*
D) all six numbers E) only one of them

17)

Let $x^2yz^3 = 7^3$ and $xy^2 = 7^9$. Then $xyz =$

A) 7^4 B) 7^6 C) 7^8 D) 7^9 E) 7^{10}

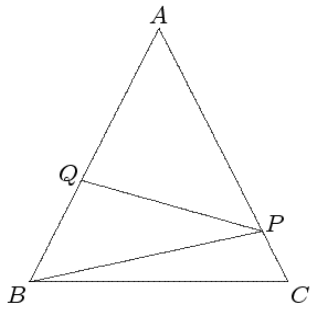
18)

How many digits can at most be erased from the 1000-digit number 20082008…2008 (continuous repetition of 2008), such that the sum of the remained digits is 2008?

A) 260 B) 510 C) 746 D) 208 E) 130

19)

The picture shows an isosceles triangle with AB=AC. If PQ is perpendicular to AB, angle BPC is 120^o and angle ABP is 50^o then what is angle PBC?



A) 5^o B) 10^o C) 15^o D) 20^o E) 25^o

20) If the sum, the product and the quotient of two non-zero numbers are all equal, what is their sum?

A) 0 B) $\frac{1}{2}$ C) $-\frac{1}{2}$ D) 1 E) δεν υπάρχουν τέτοιοι αριθμοί

Kangourou Mathematics 2008 Levels 9-10

5 points

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21) We have a five digit natural number so that all of its digits are non-zero. Each of its digits, beginning from the third (counting is done from left to right) is the sum of the two previous. How many such five digit numbers exist?

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

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22)
I have a wooden cube, with three red sides and three blue. When cutting this cube into 3 x 3 x 3 = 27 equal small cubes, how many of these have at least 2 sides one of which is red the other one blue?

A) 6 B) 12 C) 14 D) 16
E) it depends on which sides of the big cube are red and which blue

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23)
We note that $n! = 1 \cdot 2 \cdot 3 \cdot \ldots \cdot (n-1) \cdot n$. If $n! = 2^{15} \cdot 3^{6} \cdot 5^{3} \cdot 7^{2} \cdot 11 \cdot 13$, then $n =$

A) 13 B) 14 C) 15 D) 16 E) 17

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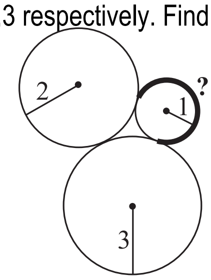
24) We have three circles tangent to each other as shown, with radii 1,2,3 respectively. Find the length of the arc in dark ink, with the shape  .



A) $\frac{5\pi}{4}$ B) $\frac{5\pi}{3}$ C) $\frac{\pi}{2}$ D) $\frac{3\pi}{2}$ E) $\frac{2\pi}{3}$

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25)
How many integers p exist for which we can find positive integer q with $pq = 5 + p + q$;

A) 1 B) 2 Γ) 3 Δ) 4 E) 5

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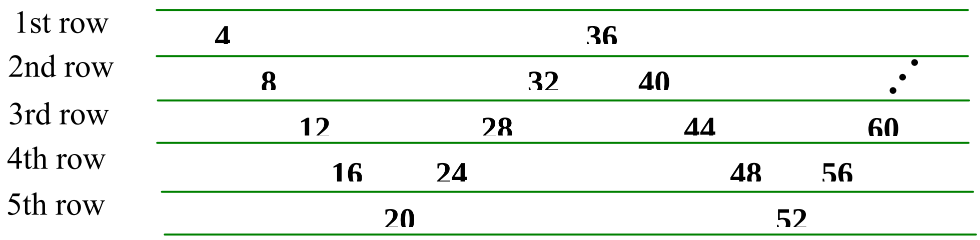
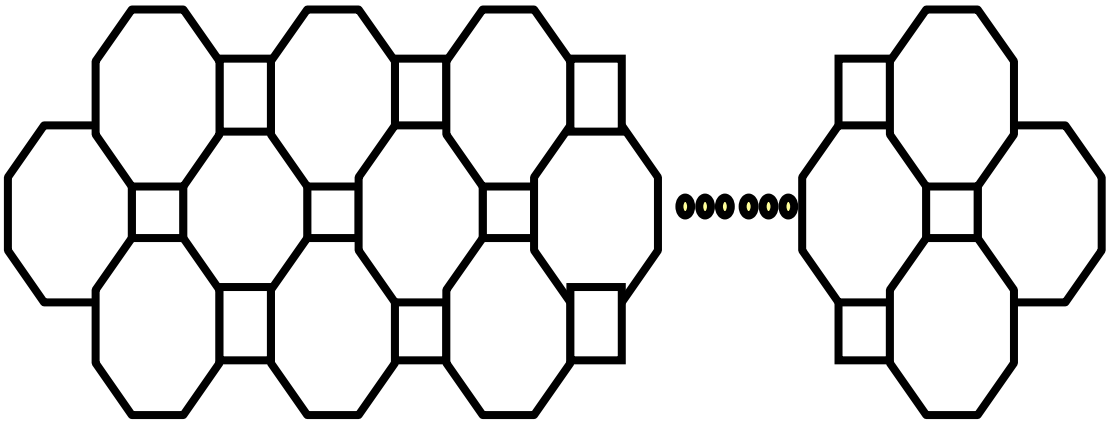
26) We write consecutively the numbers 4, 8, 12, 16, 18, ... with the following zink-zank method.
In which row the number 2008 is located?



A) 1st row B) 2nd row C) 3rd row D) 4th row E) 5th row

27)

We used metal rods to build this nice ensemble. We know there are 61 octagons, how many rods are there?



A) 488 B) 400 C) 328 D) 244 E) 446

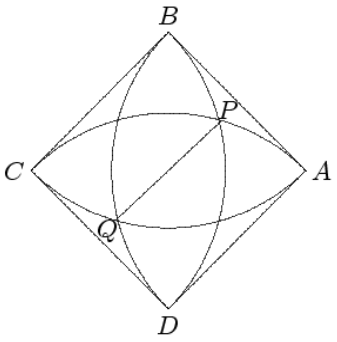
28)

Kanga always jump 1 m or 3 m long. Kanga want to go exactly 7 m. (We consider 1+3+3+3 and 3+3+3+1 as two different possibilities.) How many possibilities are there?

A) 3 B) 5 C) 6 D) 8 E) 9

29)

In the picture ABCD is a square of side 1 and the semicircles have centers on A, B, C and D. What is the length of PQ?



A) $2-\sqrt{2}$ B) $\frac{3}{4}$ C) $\sqrt{5}-\sqrt{2}$

D) $\frac{\sqrt{3}}{3}$ E) $\sqrt{3}-1$

30) Nina wants to complete the missing digits of the number 2 _ _ 8 with two digits so that the resulting number is multiple of 9. In how many different ways could this be accomplished?

A) 9 B) 10 C) 11 D) 12 E) 13