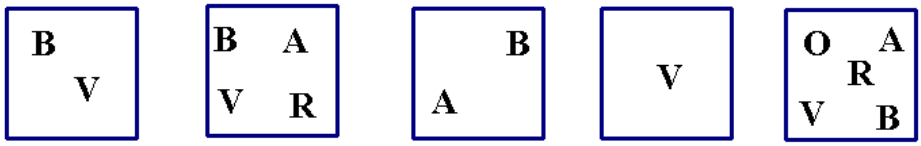
3 points

1) There are 5 boxes and each box contains some cards labeled O, A, R, V, B as shown. Peter wants to remove cards from each box in such a way that each box in the end contains only one card, and different boxes contain cards with different letters. What card remains in the box on the right?



A) it is impossible B) A C) V D) O E) R

2) Frank and Gabriel competed in running 200 meters. Gabriel made it in half a minute, but Frank made it in 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 were equally fast.

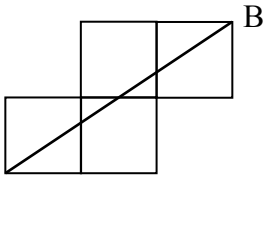
3) To greet the New Year 2008, Basil put on a T-shirt with  on it, and stood in front of a mirror on his hands, with his feet up. What was seen in the mirror by his friend Nick, who stood (on his feet) beside Basil?

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 the line AB if the side of each of the four squares is 1?



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

6) What is the least number of letters that must be removed from the word KANGOUROU so that the remaining letters are in the alphabetical order?

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

---

7) Replace the letters by digits. Each letter must be replaced by the same digit in each place. Which digit is K ?

```
  O K
+ K O
-----
W O W
```

A) 0 B) 1 C) 2 D) 8 E) 9

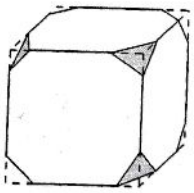
---

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

A) 40 cm B) 50 cm C) 60 cm D) 80 cm E) 100 cm

---

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



A) 26 B) 30 C) 36 D) 40 E) 48

---

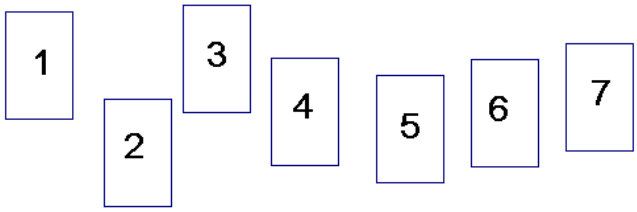
10) On my first spelling test, I score one mark out of five. If I now work hard and get full marks on every test, how many more tests should I take for my average to be four out of five correct answers?

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

---

4 points

11) A box contains seven cards. The cards are numbered from 1 to 7. Mary picks, at random, three cards from the box and afterwards John picks two cards. Two cards are left in the box. Then Mary says to John: "I know that the sum of the numbers of your cards is even." The sum of the numbers on Mary´s cards is equal to

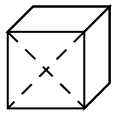


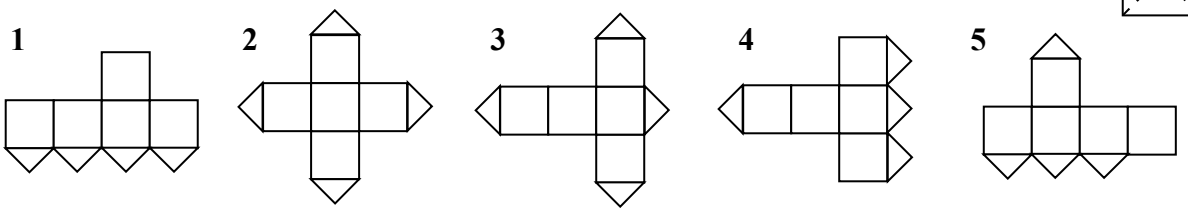
A) 10 B) 12 C) 6 D) 9 E) 15

12) The teacher has 10 boxes. The boxes contain 3, 8, 13, 18, 23, 28, 33, 48, 53 and 68 rulers. What is the least number of these boxes that the teacher should take with him so that he has exactly 100 rulers?

A) 2 B) 3 C) 4 D) 5 E) it is impossible to do

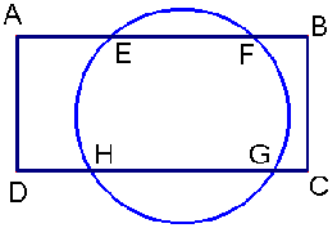
13) One of the cube faces is cut along its diagonals (see the fig.). Which of the following nets are impossible?





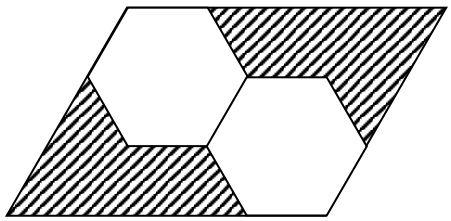
A) 1 and 3 B) 1 and 5 C) 3 and 4 D) 3 and 5 E) 2 and 4

14) The rectangle ABCD intersects a circle at points E, F, G and H. If AE = 4cm, EF = 5cm and DH = 3cm, then the length of HG is …



A) 6cm B) 7cm C) $\frac{20}{3}$ cm D) 8cm E) 9cm

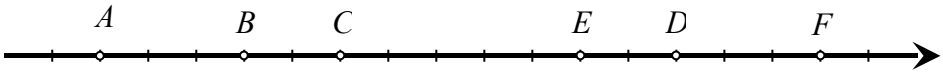
15) In the figure the two regular hexagons are equal to each other. What fraction of the parallelogram's area is shaded?



A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) $\frac{1}{5}$ E) $\frac{1}{6}$

---

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



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

---

17) The 7 dwarfs are born on the same date, but 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

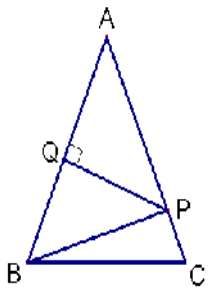
---

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

A) 564 B) 497 C) 500 D) 601 E) 746

---

19) The picture shows an isosceles triangle with AB=AC. If PQ is perpendicular to AB, the angle BPC is 120^o and the angle ABP is 50^o. How much is the angle PBC?



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

---

20) How many such pairs of real numbers exist that the sum, the product, and the quotient of these two numbers are all equal?

A) none B) 1 pair C) 2 pairs D) 4 pairs E) 8 pairs

---

5 points

21) Each digit, starting from the third one, in the decimal representation of a six-digit number is equal to the sum of two previous digits. How many six-digit numbers possess this property?

A) none B) 1 C) 2 D) 4 E) 6

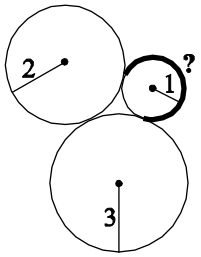
22) I have a wooden cube, with three red sides and three blue sides. When I cut this cube into 3 x 3 x 3 = 27 equal small cubes, how many of these have at least one red side and one blue side?

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

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 $n =$

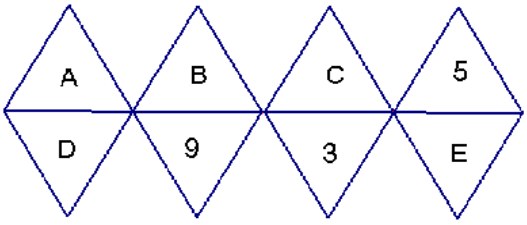
A) 13 B) 14 C) 15 D) 16 E) 17

24) Find the arc length marked by ?.



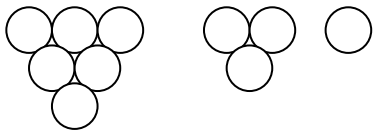
A) $\frac{5\pi}{4}$ B) $\frac{5\pi}{3}$ C) $\frac{\pi}{2}$ D) $\frac{3\pi}{2}$ E) $\frac{2\pi}{3}$

25) This net of eight equilateral triangles can be folded to form a regular octahedron.
To construct a Magic Octahedron, replace the letters A, B, C, D, and E with the numbers 2, 4, 6, 7, and 8 (without repetition) so that the sum of the four numbers on the four faces that share a vertex is the same for each vertex.
On your Magic Octahedron, how much is B+D?



A) 6 B) 7 C) 8 D) 9 E) 10

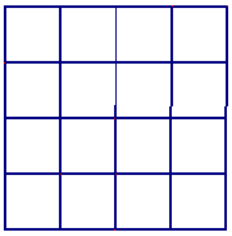
26) A 3-pyramid is a stack of the following 3 layers of balls:
In the same way we have a 4-pyramid, a 5-pyramid, etc.
All the balls anywhere on the outside of an 8-pyramid are black (balls are considered to be outside if they touch the circumscribed tetrahedron), the balls on the inside are all white.
What kind of pyramid do the white balls form?



A) 3-pyramid B) 4-pyramid C) 5-pyramid D) 6-pyramid
E) 7-pyramid

---

27) A square 4 x 4 table is divided into 16 unit squares (see the fig.) Find the maximum possible number of diagonals one can draw in these unit squares so that no two of them have any common points (including endpoints).



A) 8 B) 9 C) 10 D) 11 E) 12

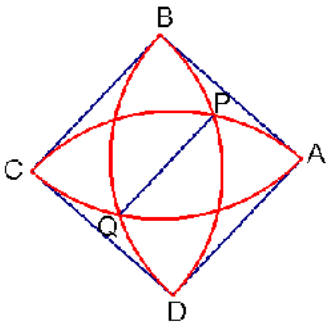
---

28) Kanga always jumps straight forward. His jumps are 1 m or 3 m long. Kanga wants to go exactly 10 m. In how many different ways can Kanga do this? (We consider 1+3+3+3 and 3+3+3+1 as two different possibilities.)

A) 28 B) 34 C) 35 D) 55 E) 56

---

29) ABCD is a square (see the fig.) of side length 1 and the quarter circles have centres 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) How many 2007-digit numbers exist, in which every two-digit number composed of two sequential digits is divisible either by 17 or by 23?

A) 5 B) 6 C) 7 D) 9 E) more than 9
