2007

wizPROF

calculator not allowed

you may use 75 minutes

of course scrap paper is allowed

results and awards at school at the end of April

20st March the answers will be on the website

wizPROF
the Netherlands: 3, 4, 5 & 6 havo/vwo
Flanders: 2nd & 3rd degree tso/aso

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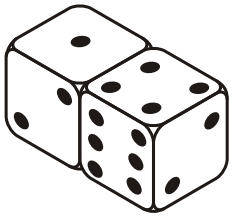
1. Sophie has to write down numbers (consisting) of five or more digits.
At most three of these digits can be greater than 2.
Sophie writes down the following numbers: 1022, 22222, 102334, 213343 en 3042531.
How many correct numbers did Sophie write down?

A. 1 **B.** 2 **C.** 3 **D.** 4 **E.** 5

2. If I give Daan two chocolate bars, I may borrow his bicycle for three hours.
If I give him 12 cookies, I may borrow his bicycle for two hours.
When I give Daan 1 bar and 3 cookies tomorrow, for how many hours may I borrow his bicycle then?

A. ½ **B.** 1 **C.** 2 **D.** 3 **E.** 4

3. You can't see a number of faces of these two ordinary dice.
What is the total number of dots on the faces that you can't see?



A. 7 **B.** 12 **C.** 15 **D.** 27 **E.** 34

4. Daan, Sem and Thomas have 30 marbles altogether. Sem gives Thomas 5 marbles.
Thomas gives 4 to Daan and Daan gives 2 to Sem. Now all three have the same number of marbles.
How many marbles did Daan have at first?

A. 8 **B.** 9 **C.** 11 **D.** 13 **E.** 15

5. Daan has 2007 marbles in three boxes: A, B and C.
Each box has the same number of marbles. Daan will move 2/3 of the marbles from box A to box C.
Now box C contains much more marbles than box A now. How many times?

A. 2 **B.** 3 **C.** 4 **D.** 5 **E.** 6

6. In the table alongside in each row and in each column two boxes have to be coloured red (R) and two boxes (in each row and each column) have to be coloured green (G). A start has already been made.
Which colours will be in the boxes 1, 2 and 3?

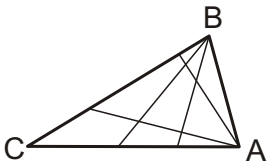
R		R	
		R	
1	2		G
	3		

A. 1 red, 2 red and 3 red **B.** 1 red, 2 green and 3 red **C.** 1 green, 2 red and 3 red
D. 1 green, 2 greoen and 3 red **E.** 1 green, 2 red and 3 green

7. A bridge club has 32 members. Every year the number of members increases by 50%.
How many members will the club have in three years time?

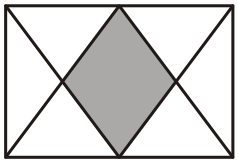
A. 80 **B.** 96 **C.** 108 **D.** 128 **E.** 182

8. In a triangle ABC four lines have been drawn,
two from vertex A and two from vertex B.
Hence the triangle is divided into 9 pieces.
In how many pieces will the triangle be divided if you draw four lines from A and four from B?



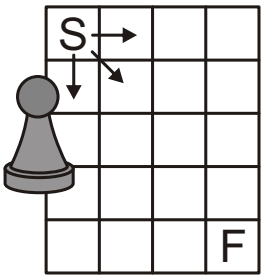
A. 16 **B.** 25 **C.** 36 **D.** 42 **E.** 49

9. In the figure alongside the area of the grey rhombus equals 6 cm^2
What is the total area of the rectangle?



A. 12 cm^2 **B.** 18 cm^2 **C.** 24 cm^2 **D.** 30 cm^2 **E.** 36 cm^2

10. You have to move your peg from start S to finish F.
Each turn you may move your peg one box down, to the right or diagonally.
In how many ways can you get from S to F using as few as possible moves?



A. 1 **B.** 4 **C.** 7 **D.** 20 **E.** 35

3 points

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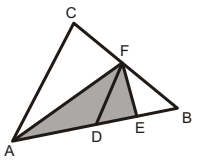
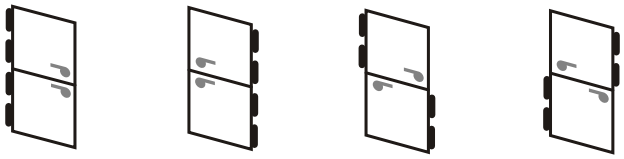
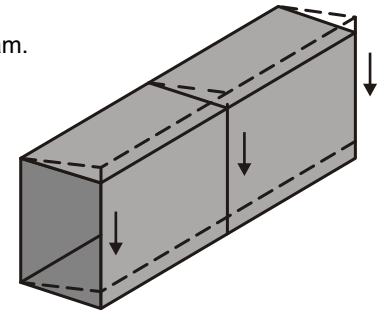
11. In triangle ABC, D is the midpoint of side AB, E is the midpoint of DB and F is the midpoint of BC. The area of triangle ABC is 96.
What is the area of triangle AEF?



A. 16 **B.** 24 **C.** 32 **D.** 36 **E.** 48

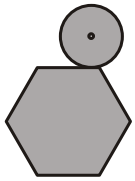
12. A corridor has subsided on the right-hand side.
As a consequence its cross-section isn't rectangular, but a parallelogram.
Halfway the corridor a door is being made.
The door has two halves, which open separately.
Where do the hinges have to be?





A. both on the left **B.** both on the right **C.** top left, bottom right
D. top right, bottom left **E.** the halves will never open properly

13. A coin with a diameter of 1 cm is being rolled on the outside of a regular hexagon.
The sides of the hexagon are 1 cm as well.
In the centre of the coin is a hole through which a pencil has been stuck.
This draws a figure around the hexagon while rolling.
What is the perimeter of this figure?

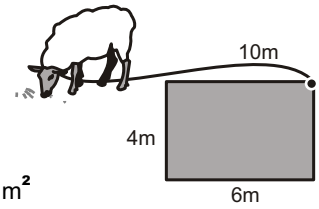


A. $6 + \pi/2$ **B.** $6 + \pi$ **C.** $6 + 2\pi$ **D.** $12 + \pi$ **E.** $12 + 2\pi$

14. Different letters stand for different digits.
What is the largest possible outcome of this sum?

A. 1995 **B.** 2007 **C.** 2576 **D.** 2577 **E.** 2581

15. The sheep is attached to a 10 metres long rope.
The rope is attached to a corner of the sheep-shed of 6 metres by 4 metres.
The area of the region the sheep can graze is



A. 20π m^2 **B.** 22π m^2 **C.** 40π m^2 **D.** 88π m^2 **E.** 100π m^2

16. Two school teams of 5 players each are playing a table tennis competition.
Every possible pair of players of one team plays every possible pair of the other team.
How many games does each player have to play?

A. 10 **B.** 20 **C.** 30 **D.** 40 **E.** 50

17. A number of pupils have tried to solve a difficult Kangaroo problem. Afterwards it turned out that the number of boys that solved the problem equals the number of girls that didn't solve the problem.
The number of girls is the number of pupils that solved the exercise.
What is underneath ?

A. twice as small as **B.** the same as **C.** one and a half times
D. twice **E.** three times

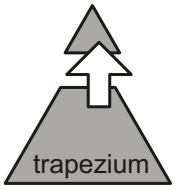
18. The circumference (in cm) of a circle equals its area (in cm^2).
What is the radius of the circle in cm?

A. 1 **B.** 2 **C.** π **D.** 4 **E.** 2π

19. We divide 336 and 2007 by a whole number. The division of 336 has remainder 2.
What is the remainder of the division of 2007?

A . 0 **B.** 1 **C.** 2 **D.** 3 **E.** 100

20. You can turn an equilateral triangle into a trapezium by cutting off a corner as shown alongside. We do it once more, making an identical trapezium.
After that we turn the two trapeziums into a parallelogram by placing them reversed against each other. The perimeter of this parallelogram is 10 cm more than the perimeter of the equilateral triangle we started with.
How many cm is the perimeter of such an equilateral triangle?



A. 10 **B.** 30 **C.** 40 **D.** 60 **E.** you can't tell

4 points

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21. We write the word KANGOEROE ten times, one after the other. That way a sequence of letters is formed: KANGOEROEKANGOEROE…KANGOEROE. Now we erase the letters at the odd positions. A shorter sequence of letters is left over in which we erase the letters at the odd positions again. We continue that way until one letter remains.
Which letter will remain?

A. K **B.** A **C.** N **D.** G **E.** O

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22. Liars and knights inhabit an island.
A liar never tells the truth and a knight always tells the truth.
One day 12 islanders are sitting together.
Two of them claim: 'There are exactly two liars among us'.
Four others claim: ' There are exactly four liars among us'.
The other six claim: 'There are exactly six liars among us'.
How many liars are there in this group of 12 islanders when you know that not all of them are liars?

A. 2 **B.** 4 **C.** 6 **D.** 8 **E.** 10

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23. It is 21:00 and I am driving along the highway at a speed of 100 km/h.
At this speed I will have sufficient petrol for a distance of 80 km, but the next petrol station is 100 km away. The petrol consumption per km is proportional to the speed of my car, for example twice as fast means twice as much consumption of petrol. I want to reach the petrol station as soon as possible.
At what time can I be at the petrol station at the earliest?

A. 22:15 hour **B.** 22:20 hour **C.** 22:25 hour **D.** 22:30 hour **E.** 22:35 hour

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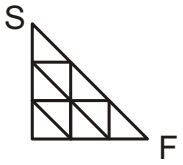
24. Daan has to go from S to F.
At each crossing he may only go (if he can) down, to the right or diagonally.



How many possible routes does Daan have?

A. 14 **B.** 16 **C.** 18 **D.** 20 **E.** 22

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25. There are twelve cards in a box:
Of each of the suits of clubs, diamonds, hearts and spades there are jack, queen and king.
You may pick three cards from the box.
Which of the following events has the largest chance of occurring?

A. The three cards are of the same ranking.
B. The three cards are of three different ranks.
C. The cards jack of diamonds, jack of hearts and queen of hearts have been drawn.
D. The three cards are of the same suit.
E. The three cards are of three different suits.

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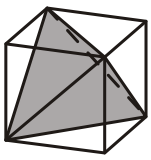
26. In a regular triangular pyramid is drawn a cube with edges of 6 cm.
How many cm^3 is the volume of this pyramid?



A. 36 **B.** 72 **C.** 108 **D.** 144 **E.** 180

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27. In a village everybody has a different number of hairs on his head.
No one has exactly 2007 hairs on his head. Sophie has the most hairs on her head in this village.
The number of inhabitants is greater than the number of hairs on Sophie's head.
How many inhabitants can the village have at most?

A. 1 **B.** 2006 **C.** 2007 **D.** 2008 **E.** 2009

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28. A number of necklaces are in a vault. Each necklace has more than 1 diamond and all necklaces have the same number of diamonds. If you know the total number of diamonds in the vault, then you will know 100% sure how many necklaces there are in the vault.
Someone tells you that the number of diamonds is in between 200 and 300.
How many necklaces are in the vault?

A. 16 **B.** 17 **C.** 19 **D.** 25 **E.** 29

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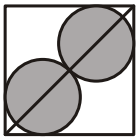
29. The centres of two circles are on a diagonal of the square. The circles are tangent to each other and to the square, as can be seen alongside. The square has sides of 1 cm.
How many cm is the sum of the radii of the two circles?



A. $2\sqrt{2}$ **B.** $8(\sqrt{2} - 1)$ **C.** $2 + \sqrt{2}$ **D.** $\frac{1}{2}\sqrt{2} + 3$ **E.** 4

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30. Five people are preparing for a Sinterklaas party. They organize a draw to decide who will have to buy a present for whom. On each of five tickets the name of one person is written.
Next the tickets are being drawn. A draw is successful if nobody draws the ticket with his own name.
How many successful draws are possible?

A. 4 **B.** 6 **C.** 9 **D.** 12 **E.** 24

5 points