

Mathematics Challenge

GRADE 6 FIRST ROUND

SEPTEMBER 2006

NOTE:

- Answer the questions according to the instructions on the answer sheet.
- You may use a calculator.
- The questions test insight. Complex calculations will therefore not be necessary.
- We hope you enjoy it!

Wiskunde-uitdaging

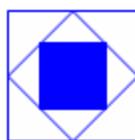
GRAAD 6 EERSTE RONDE

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LET OP:

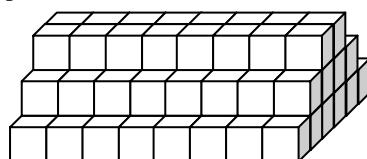
- Beantwoord die vrae volgens die instruksies op die antwoordblad.
- Jy mag 'n sakrekenaar gebruik.
- Die vrae toets insig. Omslagtige berekening is dus onnodig en tydrowend.
- Ons hoop jy geniet dit!

1. The figure is formed by successively joining the midpoints of the sides of a square. What fraction of the whole figure is shaded?



- (A) $\frac{1}{3}$ (B) $\frac{1}{4}$ (C) $\frac{1}{2}$ (D) $\frac{2}{9}$ (E) $\frac{3}{8}$

2. How many small blocks are in this solid pile?



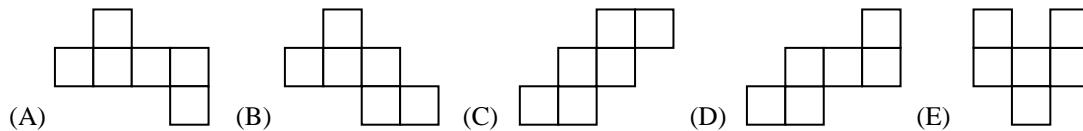
- (A) 96 (B) 24 (C) 41 (D) 32 (E) 1004

3. In the magic square below the sum of the three numbers in each row, column and diagonal is 18. What number comes in block A?

| | | |
|----|---|----|
| | | A |
| 11 | 6 | |
| | | 10 |

- (A) 1 (B) 3 (C) 5 (D) 7 (E) 9

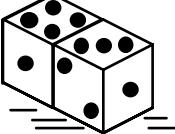
4. Which one of the following figures below *cannot* be folded along the lines to form a cube?



1. Die figuur is gevorm deur die middelpunte van opeenvolgende vierkante te verbind. Watter breudeel van die hele figuur is verdonker?

3. In die towervierkant hieronder is die som van die drie getalle in elke ry, kolom en diagonaal gelyk aan 18. Watter getal moet in blok A kom?

5. What fraction is exactly halfway between $\frac{1}{5}$ and $\frac{1}{7}$? 5. Watter breuk is presies halfpad tussen $\frac{1}{5}$ en $\frac{1}{7}$?
- (A) $\frac{1}{6}$ (B) $\frac{2}{12}$ (C) $\frac{1}{12}$ (D) 0,6 (E) Not one of these
Nie een hiervan nie
-
6. The symbol \diamond represents a number. What value of \diamond makes this sentence true?

$$\frac{\diamond}{2} = \frac{32}{\diamond}$$
- (A) 4 (B) 64 (C) 8 (D) 17 (E) 16
-
7. If you begin with a one-digit number, multiply it by 3, then add 8, then divide by 2 and then subtract 6, you will get the original number back. What is the number?
(A) 2 (B) 8 (C) 6 (D) 5 (E) 4
-
8. The numbers in the pattern 2, 7, 12, 17, 22, ... increase by five. The numbers in the pattern 3, 10, 17, 24, 31, ... increase by seven. The number 17 occurs in both patterns. If the two patterns are continued, what is the next number that will be seen in both patterns?
(A) 17 (B) 27 (C) 38 (D) 42 (E) 52
-
9. If we place dice side by side in a row on a table, only some of the faces are visible: With 2 dice in the row 8 faces are visible; with 3 dice in the row 11 faces are visible, etc. If 75 dice are placed in a row, how many faces will be visible?
- 
- (A) 75 (B) 227 (C) 225 (D) 300 (E) 275
-
10. A wooden cube, 2 cm long on each side, has a mass of 100 grams. Another cube of the same wood is 6 cm long on each side. What is its mass?
(A) 1 000 g (B) 2 700 g (C) 800 g (D) 900 g (E) 300 g
-
11. You have three 10c coins, two 5c coins and two 20c coins. In how many different ways can you give a person 35c?
(A) 1 (B) 2 (C) 3 (D) 4 (E) 5
-
12. 102 marbles are divided among 7 boys. How many more marbles are still needed so that each boy will receive the same number of marbles and there are none left over?
(A) 1 (B) 2 (C) 3 (D) 4 (E) 5
-
6. Die simbool \diamond stel 'n getal voor. Watter waarde van \diamond maak hierdie getalsin waar?

$$\frac{\diamond}{2} = \frac{32}{\diamond}$$
7. As jy begin met 'n eensyfergetal, dit vermening-vuldig met 3, dan 8 bytel, dan deel deur 2 en dan 6 aftrek, sal jy die oorspronklike getal kry. Wat is die getal?

13. The letter A is rotated 180° about O. What will the position of A be now?



13. Die letter A word deur 180° om O geroteer. Wat is die posisie van A nou?



14. Each of the nine small squares in the diagram are to be filled so that each row and each column contains exactly one 1, one 2 and one 3. What must M + N be?

| | | |
|---|---|---|
| | | M |
| | 2 | N |
| 1 | | |

(A) 2

(B) 3

(C) 4

(D) 5

(E) 6

15. In question 14, what is the sum of all nine numbers in the square?

(A) 9

(B) 12

(C) 15

(D) 18

(E) 16

16. In a chess competition players get 1 point for winning a game, $\frac{1}{2}$ a point for drawing and no points for losing.

Molly played 7 games in a tournament and only lost one game. Her final score was 5 points. How many games did she win?

(A) 5

(B) 4

(C) 3

(D) 2

(E) 1

17. The sum of two numbers is 18. What is the greatest possible product of the two numbers?

(A) 36

(B) 81

(C) 80

17. Die som van twee getalle is 18. Wat is die grootste moontlike produk van die twee getalle?

(D) 100

(E) 18

18. The first two scales below are perfectly balanced. How many squares are needed in place of ? so that the third scale will balance?



(A) 8

(B) 9

(C) 12

(D) 14

(E) 10

19. How many different triangles can you build with 7 whole matches? Note: the order of the sides does not matter, e.g. the triangles with sides 3, 3, 1 and 3, 1, 3 are the same.

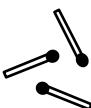
(A) 2

(B) 3

(C) 4

(D) 5

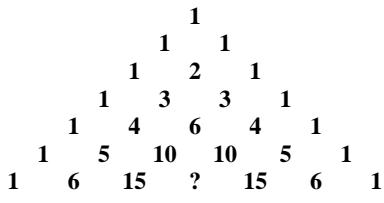
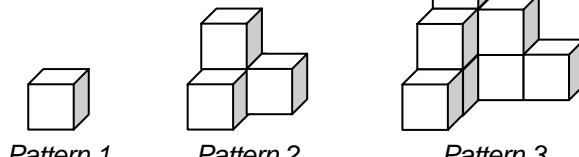
(E) 6



(D) 5

(E) 6

19. Hoeveel verskillende driehoede kan jy met 7 heel vuurhoutjies bou? Let op dat die volgorde van die snye nie saak maak nie, bv. die driehoede met snye 3, 3, 1 en 3, 1, 3 is dieselfde.

20. The sum of seven single-digit positive whole numbers is 17. If six of these numbers are equal, what is the other number?
 (A) 1 (B) 2 (C) 3 (D) 4 (E) 5
21. I am thinking of a 3-digit number which:
 When it is divided by 3 the remainder is 1
 When it is divided by 4 the remainder is 2
 When it is divided by 5 the remainder is 3
 When it is divided by 9 the remainder is 7
 What number am I thinking of?
 (A) 58 (B) 118 (C) 598 (D) 133 (E) 178
22. If a glass is full of milk, the total mass is 370 g. When the glass is half full of milk, the mass is 290 g. What is the mass of the glass?
 (A) 80 g (B) 100 g (C) 160 g (D) 180 g (E) 210 g
23. The number pattern below is called Pascal's Triangle.
 Which number is missing?

 (A) 28 (B) 20 (C) 30 (D) 19 (E) 22
24. One piece of bubble gum and one small chocolate cost R0,90. Ten pieces of bubble gum and five small chocolates cost R4,70. How much does one small chocolate cost?
 (A) R0,96 (B) R0,04 (C) R0,90 (D) R0,86 (E) R3,80
25. Thandi builds a pattern of cubes as shown. How many cubes will there be in Pattern 20?

 (A) 312 (B) 400 (C) 412 (D) 441 (E) 40
20. Die som van sewe eensyfer positiewe heelgetalle is 17.
 As ses van die getalle gelyk is, wat is die sewende getal?
21. Ek dink aan 'n 3-syfer getal wat:
 As dit deur 3 gedeel word is die res 1
 As dit deur 4 gedeel word is die res 2
 As dit deur 5 gedeel word is die res 3
 As dit deur 9 gedeel word is die res 7
 Aan watter getal dink ek?
22. Wanneer 'n glas vol melk is, is die totale massa 370 g.
 Wanneer die glas halfvol melk is, is die massa 290 g.
 Wat is die massa van die glas?
23. Die getalpatroon hieronder word Pascal se Driehoek genoem. Watter getal ontbreek?
24. Een stuk kougom en een klein sjokolade kos saam R0,90. Tien stukke kougom en vyf klein sjokolades kos R4,70. Hoeveel kos een klein sjokolade?
25. Thandi bou patronen met kubusse soos getoon. Hoeveel kubusse sal in Patroon 20 wees?