Mathematics Challenge 2009
GRADE 7 FIRST ROUND

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 2009
GRAAD 7 EERSTE RONDE

LET OP:

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

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1. What number is exactly halfway between 5,6 and 5,65?

   (A) 5,025 (B) 5,625 (C) 5,62 (D) 5,605 (E) 5,635

1. Watter getal is presies halfpad tussen 5,6 en 5,65?

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2. Which one of these is *not* true?

   (A) 1×1÷1×1 = 1 (B) 2÷2+2÷2 = 2 (C) 3×3–3+3 = 3 (D) (4–4)÷4+4 = 4 (E) 5+5×(5–5) = 5

2. Watter een hiervan is *nie* waar nie?

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3. What is the 83rd number in the following pattern?

   1; 3; 5; 7;….

   (A) 85 (B) 165 (C) 62 (D) 97 (E) 102

3. Wat sal die 83ste getal in die volgende patroon wees?

   1; 3; 5; 7;….

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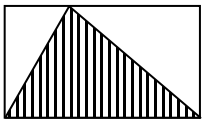
4. The sketch shows a 6 cm by 4 cm rectangle. What area is shaded?



   (A) 12 cm^2 (B) 10 cm^2 (C) 9 cm^2 (D) 8 cm^2 (E) 7 cm^2

4. Die skets toon ’n 6 cm by 4 cm reghoek. Watter oppervlakte is verdonker?

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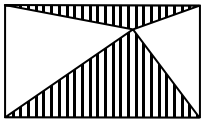
5. The sketch shows a 6 cm by 4 cm rectangle. What area is shaded?



   (A) 12 cm^2 (B) 10 cm^2 (C) 9 cm^2 (D) 8 cm^2 (E) 7 cm^2

5. Die skets toon ’n 6 cm by 4 cm reghoek. Watter oppervlakte is verdonker?

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6. Calculate the value of

$$1+\cfrac{1}{1+\cfrac{1}{1+\frac{1}{2}}}$$

   (A) $1\frac{3}{5}$ (B) $\frac{5}{8}$ (C) $1\frac{2}{3}$ (D) $3\frac{1}{2}$ (E) $5\frac{1}{2}$

6. Bereken die waarde van

$$1+\cfrac{1}{1+\cfrac{1}{1+\frac{1}{2}}}$$

AMESA The Association for Mathematics Education of South Africa

In cooperation with the
Western Cape Education Department
Gauteng Education Department

Nasou Via Afrika

CASIO

RUMEUS
Research Unit for Mathematics Education of the University of Stellenbosch

7. The average of eleven numbers is 8. If a twelfth number is added to these numbers, the average of all twelve numbers is now 11. What is the twelfth number added?

(A) 11 (B) 12 (C) 33 (D) 44 (E) 22

7. Die gemiddelde van elf getalle is 8. As ’n twaalfde getal by hierdie getalle getel word, is die gemiddelde van al twaalf getalle nou 11. Wat is die twaalfde getal wat bygetel is?

8. Arnie, Bender and Cross are three robots. They are weighed two at a time. Here are the results:

A + B = 12 kg B + C = 14 kg C + A = 16 kg

How much will all three weigh together?

(A) 21 kg (B) 42 kg (C) 28 kg (D) 32 kg (E) 14 kg

8. Arnie, Bender en Cross is drie robotte. Hulle word twee op ’n slag geweeg. Hier is die lesings:

A + B = 12 kg B + C = 14 kg C + A = 16 kg

Hoeveel sal al drie saam weeg?

9. In question 8, how much does Bender weigh on its own?

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

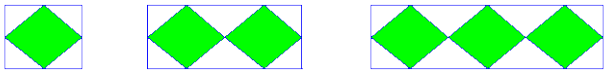
9. In vraag 8, hoeveel weeg Bender op sy eie?

10. When a number is multiplied by itself, the result is a *square number*. For example, $3 \times 3 = 9$ and $6 \times 6 = 36$ are square numbers. $12 \times 12 = 144$ is a *3-digit square number* because it has 3 digits. How many 3-digit square numbers are there?

(A) 31 (B) 961 (C) 20 (D) 21 (E) 22

10. As ’n getal met homself vermenigvuldig word, is die resultaat ’n volkome *vierkant*. Byvoorbeeld, $3 \times 3 = 9$ en $6 \times 6 = 36$ is vierkante. $12 \times 12 = 144$ is ’n *3-syfer vierkant* want dit het 3 syfers. Hoeveel 3-syfer vierkante is daar?

11. In the pattern below, the diagram with two squares has six triangles. If the pattern continues to grow, how many triangles are there in a diagram with six squares?



(A) 12 (B) 14 (C) 16 (D) 18 (E) 20

11. In die patroon hieronder: Die diagram met twee vierkante het ses driehoeke. As die patroon voortgesit word, hoeveel driehoeke is daar in ’n diagram met ses vierkante?

12. In question 11, how many triangles are there in a diagram with 60 squares?

(A) 120 (B) 122 (C) 140 (D) 160 (E) 142

12. In vraag 11: Hoeveel driehoeke is daar in ’n diagram met 60 vierkante?

13. In question 11, how many squares are there in a diagram with 60 triangles?

(A) 30 (B) 32 (C) 28 (D) 29 (E) 31

13. In vraag 11: Hoeveel vierkante is daar in ’n diagram met 60 driehoeke?

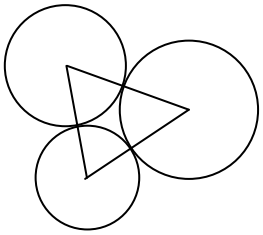
14. With one digit you can form one number, e.g. 9. With two digits (e.g. 6 and 8) you can form two numbers, namely 68 and 86. How many different four-digit numbers can be formed with four different digits?

(A) 8 (B) 10 (C) 16 (D) 24 (E) 32

14. Met een syfer kan jy een getal vorm, bv. 9. Met twee syfers (bv 6 en 8) kan jy twee getalle vorm, nl. 68 en 86. Hoeveel verskillende viersyfer-getalle kan met vier verskillende syfers gevorm word?

15. Three circles with radii 7 cm, 8 cm and 9 cm touch each other externally without overlapping. What is the perimeter of the triangle formed by joining the three centres of the circles?

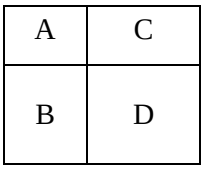
15. Drie sirkels met radiusse van 7 cm, 8 cm en 9 cm raak mekaar uitwendig. Wat is die omtrek van die driehoek wat gevorm word deur die drie middelpunte van die sirkels te verbind?



(A) 30 cm (B) 24 cm (C) 48 cm (D) 12 cm (E) $7\pi + 8\pi + 9\pi$

16. If the areas of rectangles A, B and C below are 12 cm^2, 21 cm^2 and 20 cm^2 respectively, find the area of rectangle D.

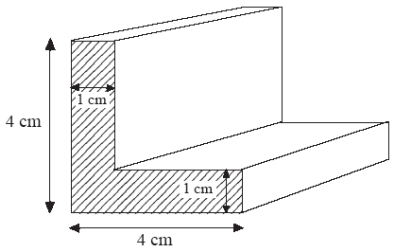
16. Die oppervlakte van reghoeke A, B en C hieronder is onderskeidelik 12 cm^2, 21 cm^2 en 20 cm^2. Vind die oppervlakte van reghoek D.



(A) 32 cm^2 (B) 35 cm^2 (C) 55 cm^2 (D) 56 cm^2 (E) 88 cm^2

17. The figure below shows a metal bar which is 4 cm high, 4 cm wide, 1 cm thick and 12 cm long. What is the volume of the bar?

17. Die skets hieronder wys ’n metaalstaaf wat 4 cm hoog, 4 cm breed, 1 cm dik en 12 cm lank is. Wat is die volume van die staaf?



(A) 96 cm^3 (B) 7 cm^2 (C) 16 cm^2 (D) 192 cm^3 (E) 84 cm^3

18. How many two-digit numbers are there with both digits even?

18. Hoeveel tweesyfer-getalle is daar met beide syfers ewe?

(A) 20 (B) 25 (C) 45 (D) 50 (E) 30

19. Numbers are arranged in the following pattern:

1	2	3	4	5	6	**row 1**
7	8	9	10	11	12	**row 2**
13	14	15	16	17	18	**row 3**
…	…	…	…	…	…	**row 4**

What will the third number in row 81 be?

(A) 480 (B) 486 (C) 483

19. Getalle word in die volgende patroon rangskik:

1	2	3	4	5	6	**ry 1**
7	8	9	10	11	12	**ry 2**
13	14	15	16	17	18	**ry 3**
…	…	…	…	…	…	**ry 4**

Wat sal die derde getal in ry 81 wees?

(D) 485 (E) 241

20. Tom, Fred and Rhoda put their apples into a bag. Tom and Fred together had 17 more apples than Rhoda. Tom had 7 apples. Rhoda had 5 apples. How many apples did Fred have?

(A) 15 (B) 10 (C) 12

20. Tom, Fred en Rhoda sit hul appels in ’n sak. Tom en Fred het saam 17 meer appel as Rhoda. Tom het 7 appels gehad. Rhoda het 5 appels gehad. Hoeveel appels het Fred gehad?

(D) 22 (E) 5

21. a, b, c and d are four adjacent dates in a calendar as shown. Which statement is NOT true for *any* calendar?

21. a, b, c en d is vier aangrensende datums in ’n kalender soos hieronder. Watter bewering is NIE waar vir *enige* kalender nie?

Mon	**Tues**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
		a	b			
		c	d			

(A) $c - a = d - b$ (B) $c = a + 7$ (C) $d = a + 8$ (D) $a + c = b + d$ (E) $a + d = c + b$

22. In the above calendar, $a + b + c + d = 52$. What is $a + b$?

22. In die kalender hierbo is $a + b + c + d = 52$. Wat is $a + b$?

(A) 19 (B) 25 (C) 26 (D) 27 (E) One cannot say / Mens kan nie sê nie

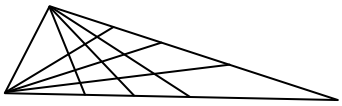
23. a, b, c and d are *any* four consecutive numbers, for example 2, 3, 4, 5 or 14, 15, 16, 17. Which statement is NOT true for any such four numbers?

23. a, b, c en d is *enige* vier opeenvolgende getalle, byvoorbeeld 2, 3, 4, 5 of 14, 15, 16, 17. Watter bewering is NIE waar vir enige sulke vier getalle nie?

(A) $c - a = d - b$ (B) $c = a + 2$ (C) $d = a + 3$ (D) $a + c = b + d$ (E) $a + d = c + b$

24. In the triangle three lines are drawn from two corners to the opposite sides of the triangle. This divides the triangle into 16 non-overlapping sections. If 10 lines from two corners are drawn in the same way, how many non-overlapping sections will the triangle have?

24. In die driehoek word drie lyne vanaf twee hoeke na die teenoorstaande sye van die driehoek getrek. Dit verdeel die driehoek in 16 dele wat mekaar nie oorvleuel nie. As 10 lyne op dieselfde manier van twee hoeke getrek word, hoeveel nie-oorvleuelende dele sal daar wees?



(A) 100 (B) 121 (C) 20 (D) 107 (E) 54

25. Calculate $(1-\frac{1}{3})\times(1-\frac{1}{4})\times(1-\frac{1}{5})\times\ldots\times(1-\frac{1}{2009})$

25. Bereken $(1-\frac{1}{3})\times(1-\frac{1}{4})\times(1-\frac{1}{5})\times\ldots\times(1-\frac{1}{2009})$

(A) $\frac{1}{2009}$ (B) $\frac{2}{2009}$ (C) $\frac{60}{2009}$ (D) $\frac{2008}{2009}$ (D) $\frac{20}{2009}$