

**Mathematics Challenge**  
**GRADE 7 FIRST ROUND**  
**SEPTEMBER 2006**

**Wiskunde-uitdaging**  
**GRAAD 7 EERSTE RONDE**  
**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!

**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. What number is exactly halfway between 5,6 and 5,65?  
 (A) 5,025            (B) 5,625            (C) 5,62

1. Watter getal is presies halfpad tussen 5,6 en 5,65?  
 (D) 5,605            (E) 5,635

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

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

- (A)  $1 \times 1 \div 1 \times 1 = 1$     (B)  $2 \div 2 + 2 \div 2 = 2$     (C)  $3 \times 3 - 3 + 3 = 3$     (D)  $(4 - 4) \div 4 + 4 = 4$     (E)  $5 + 5 \times (5 - 5) = 5$

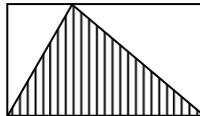
3. What is the 83<sup>rd</sup> number in the following pattern?  
 1; 3; 5; 7;....

3. Wat sal die 83ste getal in die volgende patroon wees?  
 1; 3; 5; 7;....

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

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

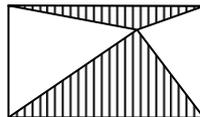
4. Die skets toon 'n 6 cm by 4 cm reghoek. Watter oppervlakte is verdonker?



- (A) 12 cm<sup>2</sup>            (B) 10 cm<sup>2</sup>            (C) 9 cm<sup>2</sup>            (D) 8 cm<sup>2</sup>            (E) 7 cm<sup>2</sup>

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

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



- (A) 12 cm<sup>2</sup>            (B) 10 cm<sup>2</sup>            (C) 9 cm<sup>2</sup>            (D) 8 cm<sup>2</sup>            (E) 7 cm<sup>2</sup>

6. Calculate the value of

6. Bereken die waarde van

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

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

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

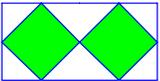
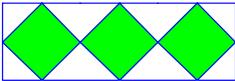
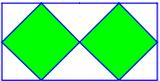
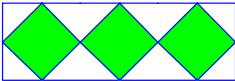


In cooperation with the  
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**Gauteng Education Department**

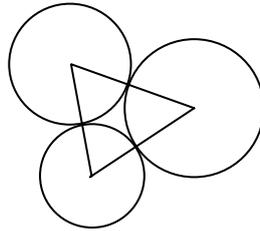


**CASIO**

**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
- 
8. Arnie, Bender and Cross are three robots. They are weighed two at a time. Here are the results:  
 $A + B = 12 \text{ kg}$      $B + C = 14 \text{ kg}$      $C + A = 16 \text{ kg}$   
 How much will all three weigh together?
- (A) 21 kg                      (B) 42 kg                      (C) 28 kg                      (D) 32 kg                      (E) 14 kg
- 
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
- 
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
- 
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
- 
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
- 
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
- 
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
- 
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?
- (A) 11                      (B) 12                      (C) 33                      (D) 44                      (E) 22
- 
8. Arnie, Bender en Cross is drie robotte. Hulle word twee op 'n slag geweeg. Hier is die lesings:  
 $A + B = 12 \text{ kg}$      $B + C = 14 \text{ kg}$      $C + A = 16 \text{ kg}$   
 Hoeveel sal al drie saam weeg?
- (A) 21 kg                      (B) 42 kg                      (C) 28 kg                      (D) 32 kg                      (E) 14 kg
- 
9. In vraag 8, hoeveel weeg Bender op sy eie?
- (A) 5 kg                      (B) 6 kg                      (C) 7 kg                      (D) 8 kg                      (E) 9 kg
- 
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?
- (A) 31                      (B) 961                      (C) 20                      (D) 21                      (E) 22
- 
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?
- 


- (A) 12                      (B) 14                      (C) 16                      (D) 18                      (E) 20
- 
12. In vraag 11: Hoeveel driehoeke is daar in 'n diagram met 60 vierkante?
- (A) 120                      (B) 122                      (C) 140                      (D) 160                      (E) 142
- 
13. In vraag 11: Hoeveel vierkante is daar in 'n diagram met 60 driehoeke?
- (A) 30                      (B) 32                      (C) 28                      (D) 29                      (E) 31
- 
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?
- (A) 8                      (B) 10                      (C) 16                      (D) 24                      (E) 32
-

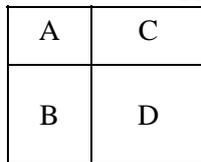
15. Three circles with radii 7 cm, 8 cm and 9 cm touch each other externally without overlapping. What is the perimeter of the triangle formed by joining the three centres of the circles?



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)  $7\pi + 8\pi + 9\pi$

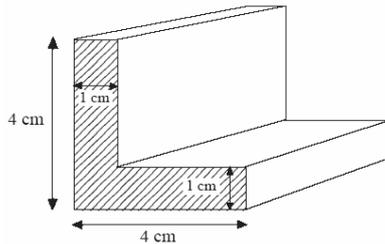
16. If the areas of rectangles A, B and C below are  $12 \text{ cm}^2$ ,  $21 \text{ cm}^2$  and  $20 \text{ cm}^2$  respectively, find the area of rectangle D.



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

- (A)  $32 \text{ cm}^2$       (B)  $35 \text{ cm}^2$       (C)  $55 \text{ cm}^2$       (D)  $56 \text{ cm}^2$       (E)  $88 \text{ cm}^2$

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)  $96 \text{ cm}^3$       (B)  $7 \text{ cm}^2$       (C)  $16 \text{ cm}^2$       (D)  $192 \text{ cm}^3$       (E)  $84 \text{ cm}^3$

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	<b>row 1</b>
7	8	9	10	11	12	<b>row 2</b>
13	14	15	16	17	18	<b>row 3</b>
...	...	...	...	...	...	<b>row 4</b>

What will the third number in row 81 be?

19. Getalle word in die volgende patroon rangskik:

1	2	3	4	5	6	<b>ry 1</b>
7	8	9	10	11	12	<b>ry 2</b>
13	14	15	16	17	18	<b>ry 3</b>
...	...	...	...	...	...	<b>ry 4</b>

Wat sal die derde getal in ry 81 wees?

- (A) 480      (B) 486      (C) 483      (D) 485      (E) 241

20. A bath fills in 12 minutes if the plug is in. It empties in 18 minutes when the tap is off. If the tap is running and the plug is out, how long will it take to fill the bath?

20. 'n Bad loop in 12 minute vol met die prop in. Dit loop in 18 minute leeg as die kraan toe is. As die kraan oop is en die prop is uit, hoe lank neem dit die bad om vol te loop?

- (A) 15 min      (B) 18 min      (C) 24 min      (D) 36 min      (E) 60 min

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

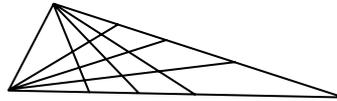
23.  $a, b, c$  and  $d$  are *any* four consecutive numbers, for example 2, 3, 4, 5 or 14, 15, 16, 17. Which statement is NOT true for any such four numbers?

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  $(1 - \frac{1}{2}) \times (1 - \frac{1}{3}) \times (1 - \frac{1}{4}) \times \dots \times (1 - \frac{1}{2006})$

25. Bereken  $(1 - \frac{1}{2}) \times (1 - \frac{1}{3}) \times (1 - \frac{1}{4}) \times \dots \times (1 - \frac{1}{2006})$

- (A)  $\frac{1}{2006}$  (B)  $\frac{1}{1003}$  (C)  $\frac{1}{24}$  (D)  $\frac{24}{2006}$  (E)  $\frac{2005}{2006}$