Mathematics Challenge

GRADE 7 FINAL ROUND
13 OCTOBER 2008

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 7 FINALE RONDE
13 OKTOBER 2008

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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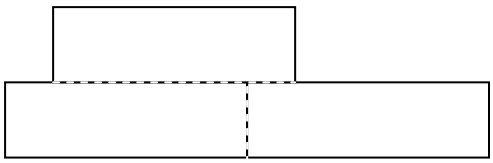
1. This figure consists of three rectangles, each measuring 3 cm by 1 cm. What is the perimeter of the figure?

1. Die figuur bestaan uit drie reghoeke, elk met afmetings van 3 cm by 1 cm. Wat is die omtrek van die figuur?



(A) 16 cm (B) 18 cm (C) 24 cm (D) 20 cm (E) 21 cm

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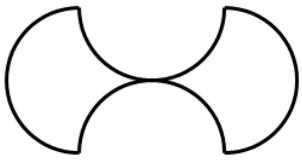
2. The figure is a combination of four semi-circles, each with a radius of 3 cm. What is the area of the figure?

2. Die figuur is ’n samestelling van vier semisirkels, elk met ’n radius van 3 cm. Wat is die oppervlakte van die figuur?



(A) 24 cm^2 (B) 9 cm^2 (C) 36 cm^2 (D) 27 cm^2 (E) None of these / Nie een hiervan nie

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3. The average mass of 3 boys is 75 kg. The average mass of 6 girls is 66 kg. What is the average mass of the 9 children together?

3. Die gemiddelde massa van 3 seuns is 75 kg. Die gemiddelde massa van 6 meisies is 66 kg. Wat is die gemiddelde massa van die 9 kinders saam?

(A) 70,5 kg (B) 68 kg (C) 70 kg (D) 69 kg (E) 69,5 kg

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4. What is the value of *a* in the table?

4. Wat is die waarde van *a* in die tabel?

1	2	3	4	…	*a*
4	6	8	10	…	64

(A) 31 (B) 16 (C) 5 (D) 57 (E) 34

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5. An article costs R36,15. This price includes Value Added Tax (VAT) of 14 %. What does the article cost without VAT?

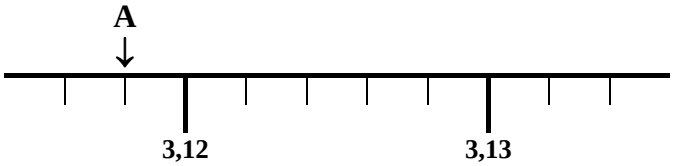
5. ’n Artikel kos R36,15. Hierdie prys sluit Belasting op Toegevoegde Waarde (BTW) van 14% in. Hoeveel kos die artikel sonder BTW?

(A) R31,08 (B) R31,09 (C) R31,72 (D) R31,71 (E) R31,07

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

6. What is the number indicated by A on the ruler?

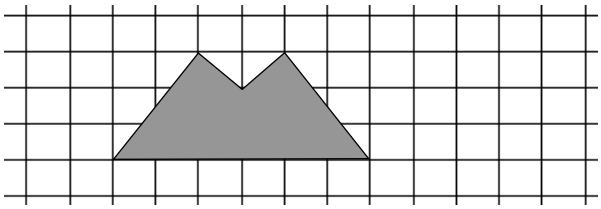
6. Wat is die getal aangedui deur A op die liniaal?



(A) 3,11 (B) 3,1 (C) 3,118 (D) 3,15 (E) 3,18

7. What is the area of the shaded figure below if one square represents 1 cm^2 ?

7. Wat is die oppervlakte van die verdonkerde figuur hieronder as een vierkantjie 1 cm^2 voorstel?



(A) 9 cm^2 (B) 10 cm^2 (C) 11 cm^2 (D) 12 cm^2 (E) 13 cm^2

8. What is the difference between the sum of the even numbers and the sum of the odd numbers from 1 to 100, both included?

8. Wat is die verskil tussen die som van die ewe getalle en die som van die onewe getalle van 1 tot 100, albei ingesluit?

(A) 50 (B) 51 (C) 49 (D) 100 (E) 99

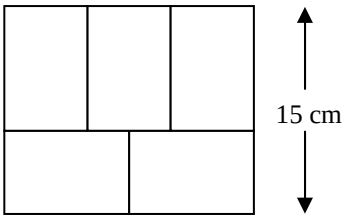
9. Sandy is 7 years younger than Mandy. In 4 years time she will be half Mandy's age. What is the sum of their ages now?

9. Sandy is 7 jaar jonger as Mandy. Oor 4 jaar sal sy die helfte so oud as Mandy wees. Wat is die som van hul huidige ouderdomme?

(a) 13 (b) 15 (c) 17 (d) 19 (e) 21

10. Five identical rectangles fit together to form a figure as shown. What is the area of the figure?

10. Vyf identiese reghoeke pas saam om 'n figuur te vorm soos getoon. Wat is die oppervlakte van die figuur?



(A) 270 cm^2 (B) 300 cm^2 (C) 330 cm^2 (D) 360 cm^2 (E) 450 cm^2

11. A painter takes two days to paint a room (all four walls and the ceiling). If he works at the same pace, how many days will he take to paint a room that is twice as wide, twice as long and twice as high?

11. 'n Verwer neem twee dae om 'n kamer te verf (al vier mure en die plafon). As hy teen dieselfde pas werk, hoeveel dae sal hy verf aan 'n kamer twee keer so lank, twee keer so breed en twee keer so hoog?

(A) 2 (B) 4 (C) 5 (D) 6 (E) 8

12. Split the number 18 into two whole numbers (e.g. 3 and 15). Now multiply these two numbers. What is the largest possible answer?

12. Verdeel die getal 18 in twee telgetalle (bv.3 en 15). Vermenigvuldig nou hierdie twee getalle. Wat is die grootste moontlike antwoord?

(A) 80 (B) 77 (C) 72 (D) 81 (E) 100

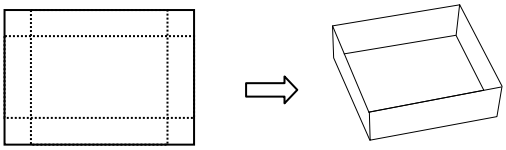
13. How many whole numbers divide exactly into 2000 (i.e. how many *factors* does 2000 have)?

13. Hoeveel telgetalle deel presies in 2000 in (d.w.s. hoeveel *faktore* het 2000)?

(A) 15 (B) 18 (C) 19 (D) 20 (E) 17

14. Four squares are cut from the corners of a rectangular sheet of cardboard. It is then folded up to make a box that is 15 cm long and 8 cm wide with a volume of 120 cm^3. What was the area of the original sheet of cardboard?

14. Vier vierkante word uit die hoeke van ’n reghoekige stuk karton gesny. Die karton word dan opgevou om ’n boks te maak wat 15 cm lank en 8 cm wyd is met ’n volume van 120 cm^3. Wat was die oppervlakte van die oorspronklike stuk karton?



(A) 144 cm^2 (B) 143 cm^2 (C) 170 cm^2 (D) 120 cm^2 (E) 240 cm^2

15. In this magic square the sum of the three numbers in each row, in each column and in each diagonal is 18. What is the value of z?

15. In hierdie towervierkant is die som van die drie getalle in elke ry, in elke kolom en in elke skuinslyn gelyk aan 18. Wat is die waarde van z?

		z
11	6	
		10

(A) 1 (B) 3 (C) 9 (D) 7 (E) 8

16. In this multiplication magic square the *product* of the three numbers in each row, in each column and in each diagonal is 1. What is the value of $r + s$?

16. In hierdie vermenigvuldigings towervierkant is die *produk* van die drie getalle in elke ry, in elke kolom en in elke skuinslyn gelyk aan 1. Wat is die waarde van $r + s$?

p	q	r
s	1	t
u	4	$\frac{1}{8}$

(A) $\frac{1}{2}$ (B) $\frac{9}{16}$ (C) $\frac{5}{4}$ (D) $\frac{33}{16}$ (E) 24

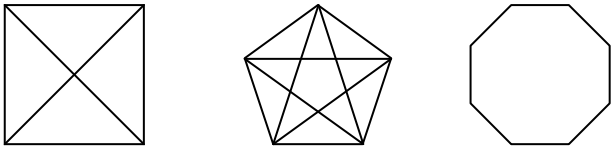
17. The three digits of a three-digit number add up to 25. How many such three-digit numbers are there?

17. Die som van die drie syfers van ’n driesyfergetal is 25. Hoeveel sulke driesyfergetalle is daar?

(A) 2 (B) 4 (C) 6 (D) 8 (E) 10

18. A square has 2 diagonals and a pentagon has 5. How many diagonals does an octagon have? (An octagon has 8 sides.)

18. ’n Vierkant het 2 hoeklyne en ’n vyfhoek het 5. Hoeveel hoeklyne het ’n agthoek?



(A) 20 (B) 28 (C) 16 (D) 24 (E) 40

19. How many diagonals does an 80-gon have?

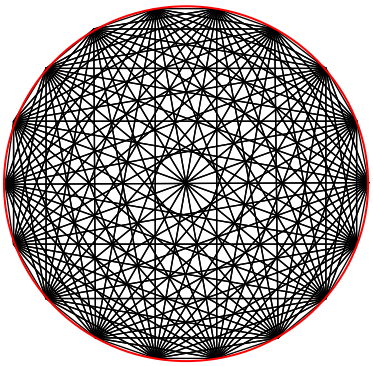
(A) 6160 (B) 200 (C) 400 (D) 3080 (E) None of these

19. Hoeveel hoeklyne het ’n 80-hoek?

(D) 3080 (E) Nie een hiervan nie

20. In this figure there are 18 points on the circle, and every point is connected to every other point on the circle. How many connecting lines are there all together?

20. In die figuur is daar 18 punte op die sirkel, en elke punt is verbind met elke ander punt op die sirkel. Hoeveel konnekterende lyne is daar altesaam?



(A) 153 (B) 324 (C) 162 (D) 306 (E) 289

21. If $a \times b = 2$, $b \times c = 24$ and $c \times a = 3$ and a, b and c are all positive, what is the value of $a + b + c$?

(A) $7\frac{1}{2}$ (B) $10\frac{1}{2}$ (C) 12 (D) 16 (E) 194

21. As $a \times b = 2$, $b \times c = 24$ en $c \times a = 3$ en a, b en c is almal positief, wat is die waarde van $a + b + c$?

22. Zola uses dots to build triangle patterns as shown below. How many dots are there in pattern $\boldsymbol{T}_{50}$?

22. Zola bou driehoek patrone met kolletjies soos hieronder. Hoeveel kolletjies is daar in patroon $\boldsymbol{T}_{50}$?

$\boldsymbol{T}_1$ $\boldsymbol{T}_2$ $\boldsymbol{T}_3$ $\boldsymbol{T}_4$ $\boldsymbol{T}_5$ $\boldsymbol{T}_6$ $\boldsymbol{T}_7$

(A) 2601 (B) 1275 (C) 2550 (D) 1250 (E) None of these

(E) Nie een hiervan nie

23. Which one of the following numbers will appear in the sequence

2; 5; 10; 17; 26; 37; ...?

(A) 901 (B) 902 (C) 903 (D) 904 (E) None of these

23. Watter een van die volgende getalle sal voorkom in die getalry

2; 5; 10; 17; 26; 37; ...?

(E) Nie een hiervan nie

24. A goldmine mines 5% of its total reserves per year on average. After how many years will more than half of the mine’s reserves be extracted?

(A) 5 (B) 10 (C) 12 (D) 14 (E) 15

24. ’n Goudmyn ontgin gemiddeld 5% van sy totale reserwes per jaar. Na hoeveel jaar sal meer as die helfte van die myn se reserwes ontgin wees?

25. Study the pattern shown below. What is the product of the numbers?

$$(1+1)\times(1+\tfrac{1}{2})\times(1+\tfrac{1}{3})\times(1+\tfrac{1}{4})\times(1+\tfrac{1}{5})\times \ldots \times(1+\tfrac{1}{100}) =$$

(A) $\frac{99}{100}$ (B) $\frac{101}{100}$ (C) $\frac{1}{100}$ (D) 100 (E) 101

25. Bestudeer die patroon hieronder. Wat is die produk van die getalle?

$$(1+1)\times(1+\tfrac{1}{2})\times(1+\tfrac{1}{3})\times(1+\tfrac{1}{4})\times(1+\tfrac{1}{5})\times \ldots \times(1+\tfrac{1}{100}) =$$