Jet SA Mathematics Challenge

GRADE 7 FINAL ROUND
7 SEPTEMBER 2011

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!

Jet SA Wiskunde-uitdaging

GRAAD 7 FINALE RONDE
7 SEPTEMBER 2011

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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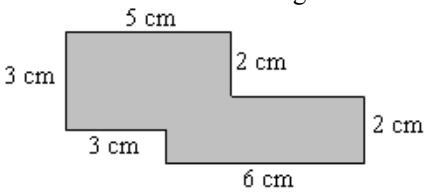
1. The figure is a combination of two rectangles with dimensions as shown. What is the area of the figure?

1. Die figuur is ’n samestelling van twee reghoeke met afmetings soos getoon. Wat is die oppervlakte van die figuur?



(A) 19 cm^2 (B) 23 cm^2 (C) 25 cm^2 (D) 26 cm^2 (E) 27 cm^2

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2. What is the perimeter of the figure in question 1?

(A) 21 cm (B) 32 cm (C) 30 cm (D) 28 cm (E) None of these / Nie een hiervan nie

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3. Calculate:

$2 - 1 + 3 - 2 + 4 - 3 + 5 - 4 + 6 - 5 + \ldots + 101 - 100$

(A) 99 (B) 100 (C) 101 (D) 102 (E) None of these / Nie een hiervan nie

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4. The *metre* was originally defined as “one ten-millionth of the distance between the Equator and the North Pole”. What is the distance between the Equator and the North Pole?

(A) 1 000 km (B) 10 000 km (C) 100 000 km (D) 1 000 000 km (E) 10 000 000 km

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

1; 3; 5; 7;….

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

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6. In the magic square below the sum of the three numbers in each row, in each column and in each diagonal is 18. What number is x?

6. In die towervierkant hieronder is die som van die drie getalle in elke ry, in elke kolom en in elke hoeklyn gelyk aan 18. Watter getal is x?

		x
11	6	
		10

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

7. Calculate:

$$\frac{24\times18\times15 + 24\times18\times13 + 24\times18\times7}{24\times18}$$

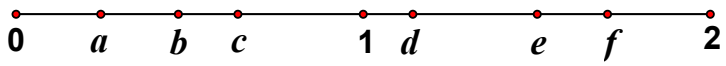
(A) $\frac{35}{36}$ (B) 35 (C) 11 340 (D) 75 355 (E) None of these / Nie een hiervan nie

7. Bereken:

$$\frac{24\times18\times15 + 24\times18\times13 + 24\times18\times7}{24\times18}$$

8. On this number line, which value could best represent $b \times c$?

8. Op hierdie getallelyn, watter waarde kan $b \times c$ die beste voorstel?



(A) a (B) 1 (C) d (D) e (E) f

9. 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?

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

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

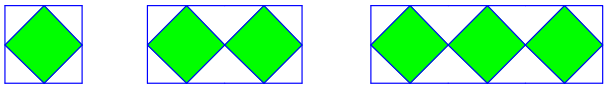
10. A water tank is $\frac{7}{8}$ full. After 420 litres had been drawn from it, it is half full. How many litres does the tank hold when it is full?

(A) 1120 (B) 735 (C) 960 (D) 367,5 (E) 840

10. Uit ’n watertenk wat $\frac{7}{8}$ vol is, word 420 liter getap. Nou is die tenk halfvol. Hoeveel liter hou die tenk as dit vol is?

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?

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 the previous question: How many triangles are there in a diagram with 60 squares?

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

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

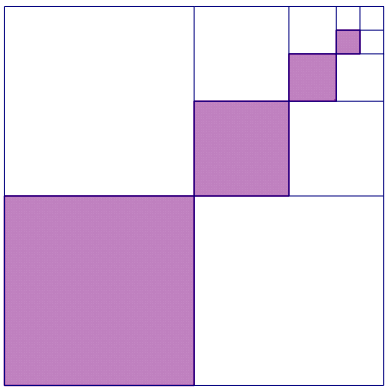
13. In the previous question: How many squares are there in a diagram with 60 triangles?

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

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

14. A square is divided into four smaller equal squares, and the process is then repeated as shown. What fraction of the large square is shaded?

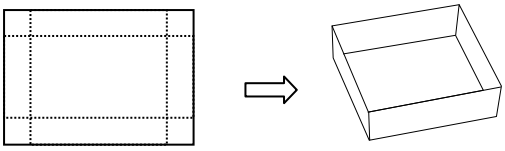
14. 'n Vierkant word in vier ewe-groot kleiner vierkante verdeel, en die proses word dan herhaal soos getoon. Watter breuk van die groot vierkant is verdonker?



(A) $\frac{1}{4}$ (B) $\frac{17}{64}$ (C) $\frac{85}{256}$ (D) $\frac{7}{16}$ (E) $\frac{65}{128}$

15. Four identical 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?

15. Vier identiese 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

16. Find the number between 20 and 80 which meets all the following conditions:

it is a prime number
if you reverse its digits, this new number is also prime
if you add 1 to the number you get a multiple of 3

(A) 53 (B) 31 (C) 67 (D) 71 (E) None of these / Nie een hiervan nie

16. Vind die getal tussen 20 en 80 wat aan al die volgende voorwaardes voldoen:

dit is 'n priemgetal
as jy die syfers omruil, is die nuwe getal ook priem
as jy 1by die getal tel kry jy 'n veelvoud van 3

17. What is the smallest number that is divisible by 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10?

(A) $3\times4\times5\times7\times9$ (B) $5\times7\times8\times9$ (C) $5\times6\times7\times8\times9$ (D) $5\times6\times8\times9$ (E) $2\times3\times4\times5\times6\times7\times8\times9\times10$

17. Wat is die kleinste getal wat deelbaar is deur 1, 2, 3, 4, 5, 6, 7, 8, 9 en 10?

18. Excluding 1 and itself, how many factors does the number $19\times29\times59\times79$ have ?

(A) 4 (B) 8 (C) 10 (D) 12 (E) 14

18. Behalwe 1 en die getal self, hoeveel faktore het die getal $19\times29\times59\times79$?

19. 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?

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

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

20. 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

20. 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?

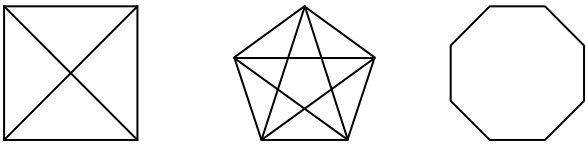
21. In the previous question, how much does Bender weigh on its own?

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

21. In die vorige vraag, hoeveel weeg Bender op sy eie?

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

22. ’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

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

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

23. Hoeveel hoeklyne het ’n 80-hoek?

(E) Nie een hiervan nie

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

(A) 10 (B) 11 (C) 12 (D) 13 (E) 14

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

25. The 100 whole numbers from 1 to 100 are written on the blackboard. You must erase any two numbers a and b and write the number $a + b$ in its place. If this process is continued, only one number will remain on the board in the end. What is this number?

(A) 5050 (B) 10100 (C) 100 (D) 4950 (E) One cannot be sure

25. Die 100 heelgetalle van 1 tot 100 word op die bord geskryf. Jy moet enige twee getalle a en b uitvee en dan die getal $a + b$ in die plek daarvan skryf. As hierdie proses voortgesit word, sal daar uiteindelik slegs een getal op die bord oorbly. Wat is hierdie getal?

(E) Mens kan nie sê nie