

Fakulteit Natuur- & Landbouwetenskappe
Faculty of Natural & Agricultural Sciences

Department of Mathematics and Applied
Mathematics
Departement Wiskunde en Toegepaste Wiskunde

MATHEMATICS COMPETITION

WISKUNDE KOMPETISIE

GRADES 8 AND 9

GRADE 8 EN 9

SEPTEMBER 2014

SEPTEMBER 2014

TIME: 2 HOURS

TYD: 2 URE

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Denkleiers • Leading Minds • Dikgopolo tša Dihlalefi

Leading Minds

INSTRUCTIONS

- ◆ No calculators or other calculation aids are allowed.
- ◆ **Mark allocation**
Every question counts 1 mark.
Random guessing is not advisable, as the mark allocated to a question may be deducted for a wrong answer.
- ◆ Every question has five possible answers, (A) to (E).
Only **ONE** answer is correct.
Colour in the rectangle of the correct answer on the answer sheet.
Do not colour outside the rectangle.
Use a soft pencil.

Example:

Suppose Question 21 reads:

The smallest integer larger than 1 is

(A) 0 (B) -1 (C) 1 (D) 2 (E) 3

The correct answer is 2, which is answer (D).

On the answer sheet you must colour in the rectangle (D) against Question 21.

Question 21 / Vraag 21 (A) (B) (C) (D) (E)

INSTRUKSIES

- ◆ Geen sakrekenaars of ander rekenhulpmiddels word toegelaat nie.
- ◆ **Puntetoekenning**
Elke vraag tel 1 punt.
Raaiery word nie aanbeveel nie, aangesien die punt toegeken aan die vraag afgetrek mag word vir 'n verkeerde antwoord.
- ◆ Elke vraag het vyf moontlike antwoorde, (A) tot (E).
Slegs **EEN** antwoord is korrek.
Kleur die reghoek van die korrekte antwoord op die antwoordvel in.
Moenie buite die reghoek inkleur nie.
Gebruik 'n sagte potlood.

Voorbeeld:

Gestel Vraag 21 is:

Die kleinste heelgetal groter as 1 is

(A) 0 (B) -1 (C) 1 (D) 2 (E) 3

Die korrekte antwoord is 2, en dit is antwoord (D).

Op die antwoordvel moet jy die reghoek (D) inkleur teenoor Vraag 21.

Question 21 / Vraag 21 (A) (B) (C) (D) (E)

Question 1

Simplify

- (A) $\frac{8}{35}$ (B) $\frac{9}{35}$ (C) $\frac{9}{23}$ (D) $\frac{1}{5}$ (E) $\frac{7}{23}$

Vraag 1

Vereenvoudig

$$\frac{1 + 2 \times 3}{3 + 4 \times 5} =$$

Question 2Find k for which

- (A) $k = 2$ (B) $k = 3$ (C) $k = 4$ (D) $k = 11$ (E) $k = 28$

Vraag 2Bepaal k sodat

$$\frac{1}{k} + \frac{1}{7} = \frac{18}{28}.$$

Question 3

Simplify

- (A) 25^2 (B) $(2 \times 5)^{10}$ (C) $2^7 5^3$ (D) 10^5 (E) $2^8 5^5$

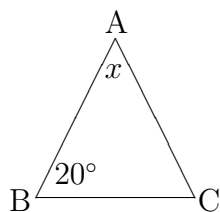
Vraag 3

Vereenvoudig

$$2^3 5^4 2^5 5 =$$

Question 4

In the given triangle sides AB and AC have the same length. Find the size of angle x .



- (A) 20° (B) 40° (C) 80° (D) 140° (E) 130°

Vraag 4

In die gegewe driehoek het sye AB en AC dieselfde lengte. Vind die grootte van hoek x .

Question 5

How many prime numbers are there between 4 and 14?

- (A) 2 (B) 3 (C) 4 (D) 5 (E) 12

Vraag 5

Hoeveel priemgetalle is daar tussen 4 en 14?

Question 6

The number $\frac{1}{4}$ lies exactly half way between $\frac{1}{5}$ and x . What is x ?

- (A) $\frac{1}{10}$ (B) $\frac{1}{3}$ (C) $\frac{1}{2}$ (D) $\frac{2}{9}$ (E) $\frac{3}{10}$

Vraag 6

Die getal $\frac{1}{4}$ lê presies halfpad tussen $\frac{1}{5}$ en x . Wat is x ?

Question 7

If a cube with side length L has a total outside area of M , then a cube with side length $2L$ has a total outside area of

- (A) $2M$ (B) $4M$ (C) $6M$ (D) $8M$ (E) $16M$
-

Question 8

The rainfall in a certain area has decreased with 10% from 2011 to 2012, and increased with 30% from 2012 to 2013. What was the percentage increase from 2011 to 2013?

- (A) -20 (B) 14 (C) 17 (D) 18 (E) 20
-

Question 9

The mathematics class average of a class of 20 pupils is 70%. The mathematics class average of another class of 10 pupils is 60%. If these two classes are combined, what is the mathematics class average of the new class?

- (A) $63\frac{1}{3}\%$ (B) 65% (C) 66% (D) $66\frac{2}{3}\%$ (E) 67%
-

Question 10

Professor Stroh has three children. It is known that at least one of them is a boy. What is the probability that they are all boys?

- (A) $\frac{1}{3}$ (B) $\frac{1}{4}$ (C) $\frac{1}{8}$ (D) $\frac{3}{8}$ (E) $\frac{1}{7}$
-

Question 11

Complete

Vraag 7

As 'n kubus met sylengte L 'n totale buite-oppervlakte van M het, dan het 'n kubus met sylengte $2L$ 'n totale buite-oppervlakte van

- (A) $2M$ (B) $4M$ (C) $6M$ (D) $8M$ (E) $16M$
-

Vraag 8

Die reënval in 'n sekere gebied het gedaal met 10% vanaf 2011 tot 2012, en gestyg met 30% vanaf 2012 tot 2013. Wat was die persentasie styging vanaf 2011 tot 2013?

- (A) -20 (B) 14 (C) 17 (D) 18 (E) 20
-

Vraag 9

Die gemiddelde wiskundepunt van 'n klas van 20 leerlinge is 70%. Die gemiddelde wiskundepunt van 'n ander klas van 10 leerlinge is 60%. Wat is die gemiddelde wiskundepunt van die klas wat ontstaan as hierdie twee klasse gekombineer word?

- (A) $63\frac{1}{3}\%$ (B) 65% (C) 66% (D) $66\frac{2}{3}\%$ (E) 67%
-

Vraag 10

Professor Stroh het drie kinders. Dit is bekend dat minstens een van hulle 'n seun is. Wat is die waarskynlikheid dat hulle almal seuns is?

- (A) $\frac{1}{3}$ (B) $\frac{1}{4}$ (C) $\frac{1}{8}$ (D) $\frac{3}{8}$ (E) $\frac{1}{7}$
-

Vraag 11

Voltooi

$$1234 \times 789 =$$

- (A) 973 620 (B) 973 622 (C) 973 624 (D) 973 626 (E) 973 628
-

Question 12**Vraag 12**

$$a + b = 9,$$
$$ab = 3,$$
$$a^2 + b^2 = ?$$

- (A) 6 (B) 75 (C) 76 (D) 78 (E) 81
-

Question 13**Vraag 13**

Three apples and two pears cost R6.60.
Two apples and three pears cost R6.90.
What is the price of one apple?

Drie appels en twee pere kos R6.60. Twee appels en drie pere kos R6.90. Wat is die prys van een appel?

- (A) R1.00 (B) R1.20 (C) R1.30 (D) R1.40 (E) R1.50
-

Question 14**Vraag 14**

John makes his cold drink with 3 parts water to 1 part concentrate. Peter makes his cold drink with 4 parts water to 1 part concentrate. Equal volumes of John's and Peter's cold drinks are mixed. What is the ratio water:concentrate of this mix?

Jan meng sy koeldrank met 3 dele water tot 1 deel konsentraat. Pieter meng sy koeldrank met 4 dele water tot 1 deel konsentraat. Gelyke volumes van Jan en Pieter se koeldranke word gemeng. Wat is die verhouding water:konsentraat van hierdie mengsel?

- (A) $3\frac{4}{9} : 1$ (B) $3\frac{5}{9} : 1$ (C) $3\frac{1}{2} : 1$ (D) $3\frac{7}{9} : 1$ (E) $3\frac{1}{3} : 1$
-

Question 15**Vraag 15**

Two trains, separated by 50 km, are facing each other. Both travel at a speed of 100 km/h relative to the ground. A bee starts at one train, and flies to and fro between the two trains, at a speed of 300 km/h. What is the total distance travelled by the bee once the two trains meet?

Twee treine, 50 km van mekaar af, ry na mekaar toe. Albei ry teen 'n spoed van 100 km/h relatief tot die grond. 'n By begin by een trein, en vlieg heen-en-weer tussen die twee treine, met 'n spoed van 300 km/h. Wat is die totale afstand wat die by afgelê het teen die tyd dat die twee treine bymekaar is?

- (A) 50 km (B) $66\frac{2}{3}$ km (C) 75 km (D) 90 km (E) 150 km
-

Question 16**Vraag 16**

In this right-angled triangle, $\frac{a}{b} = \frac{1}{2}$. Find a .

In hierdie reghoekige driehoek, is $\frac{a}{b} = \frac{1}{2}$. Bereken a .



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

Question 17

John takes 4 hours to mow the rugby field lawn. Peter takes 6 hours to mow the same rugby field lawn. How long will it take, in hours:minutes, if John and Peter mow the lawn simultaneously?

- (A) 5 : 00 (B) 3 : 06 (C) 2 : 48

Vraag 17

Jan neem 4 uur om die rugbyveld se gras te sny. Pieter neem 6 uur om dieselfde rugbyveld se gras te sny. Hoe lank sal dit neem, in uur:minutes, as Jan en Pieter gelyktydig die rugbyveld se gras sny?

- (D) 2 : 24 (E) 1 : 36
-

Question 18

If

$$1 + 2 + 3 + \dots + 50 = 1275, \text{ and / en}$$

$$1 + 2 + 3 + \dots + 25 = 325, \text{ then / dan}$$

$$1 + 3 + 5 + \dots + 49 =$$

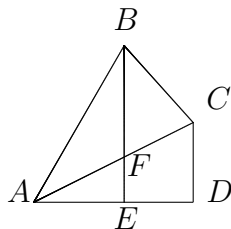
- (A) 625 (B) 650 (C) 900 (D) 950 (E) 1225
-

Vraag 18

As

Question 19

In the figure below $CD=CF=AF=BF$, $AB=AD$, angle $ABC = \text{angle } ADC = 90^\circ$, and angle $BAC = \text{angle } DAC$. What is angle BAC ?



- (A) 15° (B) 20° (C) 30° (D) 40° (E) 45°
-

Vraag 19

In die skets hieronder is $CD=CF=AF=BF$, $AB=AD$, hoek $ABC = \text{hoek } ADC = 90^\circ$, en hoek $BAC = \text{hoek } DAC$. Hoe groot is hoek BAC ?

Question 20

Jack and Jill plays the following game : An integer between 1 and 999 inclusive is selected and given to Jack. Whenever Jack receives a number, he doubles it and passes the result to Jill. Whenever Jill receives a number, she adds 50 to it and passes the result to Jack. This process is continued until a number bigger or equal to a 1000 is reached. The winner is the last person who produces a number less than 1000. Let N be the smallest initial number that results in a win for Jack. What is the sum of the digits of N ?

- (A) 6 (B) 7 (C) 8 (D) 9 (E) 10
-

Vraag 20

Jack en Jill speel die volgende speltjie: 'n Heelgetal tussen 1 en 999 insluitend word gekies en vir Jack gegee. Wanneer Jack 'n getal kry, verdubbel hy dit en gee dit vir Jill. Wanneer Jill 'n getal kry, tel sy 50 by en gee dit terug vir Jack. Die proses word herhaal totdat 'n getal groter of gelyk aan 1000 bereik word. Die wenner is die laaste persoon wat 'n getal kleiner as 'n 1000 maak. Laat N die kleinste begin getal wees wat vir Jack 'n wen gee. Wat is die som van die syfers van N ?