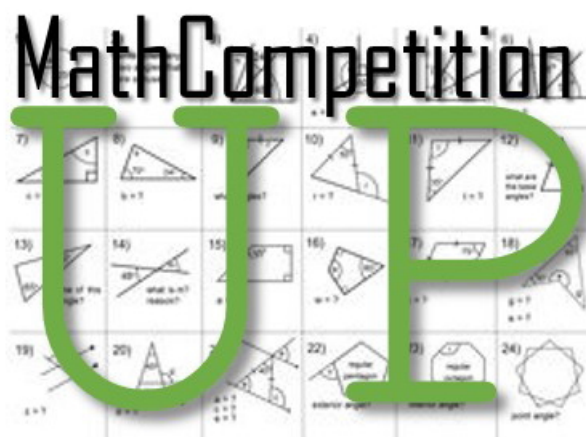


Math Competition

UJEP



Department of Mathematics and Applied
Mathematics
Departement Wiskunde en Toegepaste Wiskunde

GRADES 8 AND 9

GRADE 8 EN 9

AUGUST 2016

AUGUSTUS 2016

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**Vraag 1**

$$\frac{12345}{1+2+3+4+5} =$$

- (A) 813 (B) 823 (C) 833 (D) 843 (E) 853
-

Question 2

If $2 + \frac{x}{3} = 22$, then x equals

Vraag 2

As $2 + \frac{x}{3} = 22$, dan is x gelyk aan

- (A) 72 (B) -66 (C) 66 (D) 60 (E) -60
-

Question 3

$$12^3 =$$

Vraag 3

$$12^3 =$$

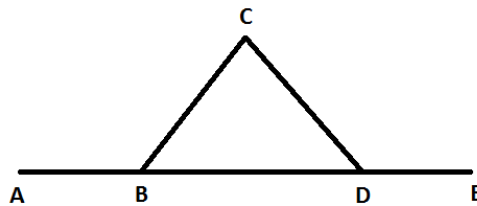
- (A) $2^8 \times 3^3$ (B) $2^4 \times 3^2$ (C) $2^2 \times 3^2$ (D) $2^9 \times 3^2$ (E) $2^6 \times 3^3$
-

Question 4

In the diagram $\hat{A}BC = 105^\circ$ and $\hat{C}DE = 140^\circ$. Find $\hat{B}CD$ if $ABDE$ is a straight line.

Vraag 4

In die diagram is $\hat{A}BC = 105^\circ$ en $\hat{C}DE = 140^\circ$. Bereken $\hat{B}CD$ as $ABDE$ 'n reguit lyn is.



- (A) 75° (B) 65° (C) 55° (D) 45° (E) 35°
-

Question 5

Suppose N is the smallest positive integer whose sum of its digits is 2016. How many digits does N have?

Vraag 5

Veronderstel N is die kleinste positiewe heelgetal waarvan die som van die syfers 2016 is. Hoeveel syfers het N ?

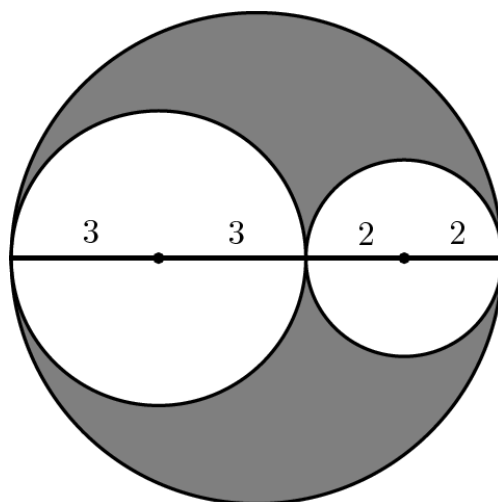
- (A) 221 (B) 222 (C) 223 (D) 224 (E) 225
-

Question 6

Three circles of radius 2, 3 en 5 are shown below. What is the area of the shaded region?

Vraag 6

Beskou die drie sirkels hieronder met strale 2, 3 en 5. Wat is die oppervlakte van die gekleurde gebied?



- (A) 6π (B) 8π (C) 10π (D) 12π (E) 13π
-

Question 7

In George High School, 30% of the students in the math club are in the science club and 50% of the students in the science club is in the math club. If there are 12 students in die science club, how many are there in the math club?

Vraag 7

In George Hoërskool behoort 30% van die studente in die wiskunde klub aan die wetenskap klub en 50% van die studente in die wetenskap klub aan die wiskunde klub. As daar 12 studente in die wetenskap klub is, hoeveel studente is in die wiskunde klub?

- (A) 10 (B) 15 (C) 20 (D) 25 (E) 30
-

Question 8

Which of the expressions below is equal to $(x \div (y^2 \div z^3)) \div ((x^3 \div y^2) \div z)$?

Vraag 8

Watter van die volgende uitdrukkings is gelyk aan $(x \div (y^2 \div z^3)) \div ((x^3 \div y^2) \div z)$?

- (A) $\frac{z^4}{x^2}$ (B) $\frac{z^3}{x^3}$ (C) $\frac{z^2}{x^2}$ (D) $\frac{z^4}{x^3}$ (E) $\frac{z^2}{x^4}$
-

Question 9

Jack can answer each question in a test in 3 minutes whilst Jill can answer each question in the test in 1 minute. Jill takes a nap for an hour in the middle of the test. They finish at the same time. How many questions were in the test?

- (A) 20 (B) 25 (C) 30 (D) 40 (E) 60
-

Question 10

If $U = 1\frac{7}{9}$ and $P = 6\frac{1}{4}$, find $\sqrt{U} + \sqrt{P}$.

- (A) $3\frac{11}{12}$ (B) $3\frac{7}{9}$ (C) $3\frac{29}{36}$

Vraag 9

Jack kan elke vraag in 'n toets in 3 minute beantwoord terwyl Jill elke vraag in die toets in 1 minuut kan beantwoord. Jill het 'n slapie van 'n uur gevang in die middel van die toets. Hoeveel vrae was in dié toets as Jack en Jill die toets in dieselfde tyd voltooi het?

- (D) 40 (E) 60
-

Vraag 10

As $U = 1\frac{7}{9}$ en $P = 6\frac{1}{4}$, bereken $\sqrt{U} + \sqrt{P}$.

- (D) $3\frac{13}{18}$ (E) $3\frac{5}{6}$
-

Question 11

Joe runs 16 km in 90 minutes. He runs the first 10 km at an average speed of 12 km/h. What is his average speed for the last 6 km?

- (A) 6 km/h (B) 8 km/h (C) 9 km/h (D) 10 km/h (E) 12 km/h
-

Vraag 11

Joe hardloop 16 km in 90 minute. Hy hardloop die eerste 10 km teen 'n gemiddelde spoed van 12 km/h. Wat is sy gemiddelde spoed vir die laaste 6 km?

Question 12

Suppose $x = 3$, $y = 4x$ and $z = 5y$. What is the average of x , y and z ?

- (A) 27 (B) 25 (C) 23 (D) 21 (E) 19
-

Vraag 12

Veronderstel $x = 3$, $y = 4x$ en $z = 5y$. Wat is die gemiddelde van x , y en z ?

Question 13

A stick of length a makes a shadow of length b . At the same time a tree has a shadow of length c . How tall is the tree in terms of a , b and c ?

- (A) $\frac{ac}{b}$ (B) $\frac{bc}{a}$ (C) $\frac{ab}{c}$

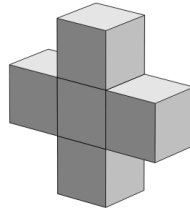
Vraag 13

'n Stokkie van lengte a maak 'n skaduwee van lengte b . Op dieselde tydstip is daar 'n boom wat se skaduwee 'n lengte van c maak. Hoe lank is die boom in terme van a , b en c ?

- (D) $\frac{a^2 + b^2 + c^2}{a + b + c}$ (E) $\frac{ab}{c} + \frac{bc}{a} + \frac{ca}{b}$
-

Question 14

The diagram shows a solid shape made out of five cubes. What is the SURFACE area of the shape if the volume of the solid is 40 cm^3 ?



- (A) 80 cm^2 (B) 84 cm^2 (C) 88 cm^2 (D) 96 cm^2 (E) 100 cm^2
-

Question 15

A couple has four children. What is the probability of having two sons and two daughters if the probability of each gender is equally likely?

- (A) $\frac{1}{2}$ (B) $\frac{3}{4}$ (C) $\frac{3}{8}$ (D) $\frac{5}{8}$ (E) $\frac{7}{16}$
-

Question 16

If U and P are missing digits in the calculation below, what is $U+P$?

$$\begin{array}{r} U3 \\ \times 3P \\ \hline =2016 \end{array}$$

- (A) 6 (B) 8 (C) 9 (D) 10 (E) 12
-

Question 17

There is a real value for x such that there is a rectangle with sides $2x + 1$, $4x$, $6x - 5$ and $\frac{3}{x} + 4$ in some order. What is the perimeter of this rectangle?

- (A) 20 (B) 18 (C) 22 (D) 16 (E) 24
-

Vraag 14

Die diagram wys 'n soliede voorwerp wat gemaak is uit vyf kubusse. Wat is die BUIITE OPPERVLAKTE van die voorwerp as die volume van die voorwerp 40 cm^3 is?

Vraag 15

'n Gesin het vier kinders. Wat is die waarskynlikheid om twee seuns en twee dogters te hê as die waarskynlikheid vir elke geslag dieselfde is?

Vraag 16

As U en P ontbrekende syfers in die berekening hieronder is, wat is $U+P$?

Vraag 17

Daar is 'n waarde vir x sodat 'n reghoek met sye $2x + 1$, $4x$, $6x - 5$ en $\frac{3}{x} + 4$ in 'n sekere volgorde bestaan. Wat is die omtrek van die reghoek?

Question 18

The number 24 has eight factors, namely 1, 2, 3, 4, 6, 8, 12 and 24. Tshepo writes down all the factors of 1000 and multiplies them all together. What number does he get?

- (A) 10^{12} (B) 10^{15} (C) 10^{18} (D) 10^{24} (E) 10^{27}
-

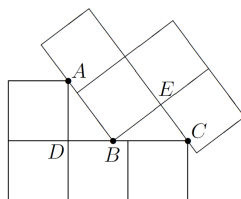
Question 19

How many odd three-digit numbers have all three digits different? (Note 105 is one, but 227 is not one.)

- (A) 288 (B) 300 (C) 320 (D) 360 (E) 405
-

Question 20

Eight 1×1 squares are glued together to make two groups of four and the groups are pressed together so that they meet in three points A , B and C as shown in the diagram. Find the distance AB .



- (A) $\frac{3}{2}$ (B) $\frac{4}{3}$ (C) $\frac{5}{3}$ (D) $\frac{6}{5}$ (E) $\frac{5}{4}$
-

Vraag 18

Die getal 24 het agt faktore, naamlik 1, 2, 3, 4, 6, 8, 12 en 24. Tshepo skryf al die faktore van 1000 neer en vermenigvuldig dit alles met mekaar. Watter getal kry hy?

Vraag 19

Hoeveel onewe drie-syfer getalle het al drie syfers verskillend? (Let op 105 is een, maar 227 is nie een nie.)

Vraag 20

Agt 1×1 vierkante word vasgeplak om twee groepe van vier vierkante te vorm. Die vierkante word saamgesit sodat hulle in drie punte A , B en C ontmoet soos aangetoon in die figuur. Bepaal die afstand AB .