

Math Competition

UJEP

Department of Mathematics and Applied
Mathematics
Departement Wiskunde en Toegepaste Wiskunde

GRADES 8 AND 9

GRADE 8 EN 9

29 July – 4 Aug 2019

29 Julie – 4 Aug 2019

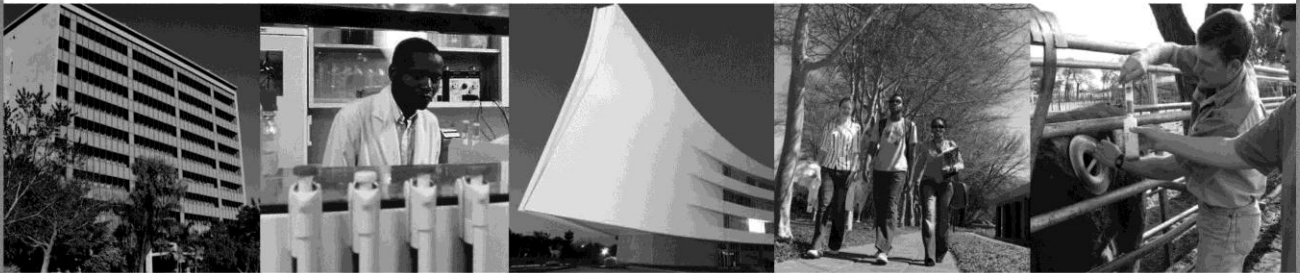
TIME: 2 HOURS

TYD: 2 URE

NO CALCULATORS.

GEEN SAKREKENAARS.

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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

If $a \star b = \frac{a+b}{ab}$, then $8 \star 4$ equals

- (A) $\frac{8}{3}$ (B) $\frac{3}{8}$ (C) $\frac{3}{4}$ (D) $\frac{4}{3}$ (E) $\frac{12}{3}$
-

Vraag 1

As $a \star b = \frac{a+b}{ab}$, dan is $8 \star 4$ gelyk aan

- (A) $\frac{8}{3}$ (B) $\frac{3}{8}$ (C) $\frac{3}{4}$ (D) $\frac{4}{3}$ (E) $\frac{12}{3}$
-

Question 2

If $\frac{x}{3} - 2 = \frac{7}{6}$, what is x ?

- (A) $\frac{43}{6}$ (B) $\frac{19}{2}$ (C) 9 (D) $\frac{17}{6}$ (E) 7
-

Vraag 2

As $\frac{x}{3} - 2 = \frac{7}{6}$, wat is x ?

- (A) $\frac{43}{6}$ (B) $\frac{19}{2}$ (C) 9 (D) $\frac{17}{6}$ (E) 7
-

Question 3

You pick a prime number, multiply it by three, and then divide it by two. The resulting number is between nine and twelve. What was the prime number you picked?

- (A) 3 (B) 5 (C) 7 (D) 11 (E) 13
-

Vraag 3

Jy kies 'n priemgetal. Jy maal die getal met drie en deel dit dan deur twee. Die finale getal is tussen nege en twaalf. Wat was die priemgetal wat jy gekies het?

- (A) 3 (B) 5 (C) 7 (D) 11 (E) 13
-

Question 4

If $a + b = 5$ and $a - b = 3$, what is a ?

- (A) 1 (B) 2 (C) 3 (D) 4 (E) 5
-

Vraag 4

As $a + b = 5$ en $a - b = 3$, wat is a ?

- (A) 1 (B) 2 (C) 3 (D) 4 (E) 5
-

Question 5

Calculate 123×456

- (A) 54988 (B) 55978 (C) 55988 (D) 56078 (E) 56088
-

Vraag 5

Bereken 123×456

- (A) 54988 (B) 55978 (C) 55988 (D) 56078 (E) 56088
-

Question 6

What number should be removed from the list below so that the average of the remaining numbers is 6.1?

- (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

Vraag 6

Watter getal moet van die lys verwyder word sodat die gemiddeld van die oorblywende getalle 6.1 is?

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

- (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

Question 7

If a cube with side length L has a volume of V , then a cube with side length $2L$ has a volume of

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

Vraag 7

As 'n kubus met sylengte L 'n volume van V het, dan het 'n kubus met sylengte $2L$ 'n volume van

Question 8

If q and r are odd numbers, which of the following will be an even number?

- (A) $q + r + 7$ (B) $q^2 - r$ (C) q^2r (D) $q^2(1 + r) - 1$ (E) $q^2 + r + 3$
-

Vraag 8

As q en r onewe getalle is, watter een van die volgende sal 'n ewe getal wees?

Question 9

A number x is exactly halfway between 1 and $4x - 2$. What is x ?

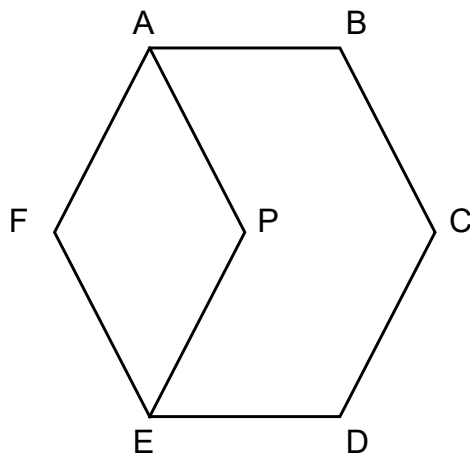
- (A) $\frac{1}{2}$ (B) $\frac{1}{3}$ (C) $\frac{1}{4}$ (D) $\frac{3}{4}$ (E) 1
-

Vraag 9

'n Getal x is presies halfpad tussen 1 en $4x - 2$. Wat is x ?

Question 10

In the figure below, ABCDEF is a regular hexagon. What is the circumference of parallelogram APEF if $AF=5$?

**Vraag 10**

In die figuur hieronder is ABCDEF 'n gelyksydige seshoek. Wat is die omtrek van parallelogram APEF as $AF=5$?

- (A) 14 (B) 16 (C) 18 (D) 20 (E) 22

Question 11

Thabo runs one kilometer at a speed of 6 km/h and then the next kilometer at 8 km/h. What is his average speed for the 2 kilometer jog?

- (A) 7km/h (B) $\sqrt{48}$ km/h (C) 7.2km/h (D) $\frac{48}{7}$ km/h (E) 7.5km/h
-

Vraag 11

Thabo hardloop een kilometer teen 'n spoed van 6 km/h en dan die volgende kilometer teen 8 km/h. Wat is sy gemiddelde spoed vir die 2 kilometer draf?

Question 12

You and Lesedi decide to paint a wall. It would take you two hours to paint the wall by yourself and it would take Lesedi three hours to paint the wall by herself. How long will it take you to paint the wall together?

- (A) 64 min (B) 66 min (C) 68 min (D) 70 min (E) 72 min
-

Vraag 12

Jy en Lesedi besluit om 'n muur te verf. Dit sal jou twee ure neem om die muur alleen te verf, en dit sal Lesedi drie ure neem om die muur alleen te verf. Hoe lank sal dit neem as julle die muur saam verf?

Question 13

You wish to buy an item in a shop that usually costs P rands. Currently it is discounted by 20%. If your friend pays 10% of the current discounted price, what percentage of P will you need to pay?

- (A) 70% (B) 71% (C) 72%

Vraag 13

Jy wil 'n item in die winkel koop wat gewoonlik P rand kos. Tans is daar 'n 20% afslag op die item. As jou vriend 10% van die huidige afslagprys betaal, watter persentasie van P sal jy moet betaal?

- (D) 73% (E) 74%
-

Question 14

Two classes write a Maths test. The average for class A is 60%, the average for class B is 75%, and the average for the two classes combined is 70%. What is the ratio of the size of class A to the size of class B?

- (A) 1 : 2 (B) 2 : 1 (C) 1 : 3

Vraag 14

Twee klasse skryf 'n Wiskunde toets. Die gemiddeld vir klas A is 60%, die gemiddeld vir klas B is 75%, en die gemiddeld vir die twee klasse tesame is 70%. Wat is die verhouding van die grootte van klas A tot die grootte van klas B?

- (D) 3 : 1 (E) 2 : 3
-

Question 15

The angles of a triangle are in the ratio 2 : 3 : 4. What is the size of the biggest angle?

- (A) 50° (B) 60° (C) 70° (D) 80° (E) 90°

Vraag 15

Die hoeke van 'n driehoek is in die verhouding 2 : 3 : 4. Wat is die grootte van die grootste hoek?

Question 16

An isosceles triangle is drawn so that each of its vertices lies on a circle of radius 1 cm. The length of one side of this triangle is equal to the diameter of the circle. What is the perimeter of this triangle in cm?

- (A) $\frac{\pi}{2}$ (B) $\sqrt{2}$ (C) $2 + \sqrt{2}$ (D) $2 + 2\sqrt{2}$ (E) Not enough information / Nie genoeg inligting
-

Question 17

Two boats are traveling along a straight line at constant speed. At first, boat A is 50 meter behind boat B. However, after 36 seconds, boat A is 20 meter ahead of boat B. If boat A is traveling at 20 km/h, what is the speed of boat B?

- (A) 10km/h (B) 11km/h (C) 12km/h (D) 13km/h (E) 14km/h
-

Question 18

Ann, Ben and Con are three people. One of them is a liar who always tells lies, another is a saint who always tells the truth, and the third is a switcher who sometimes tells the truth and sometimes lies. They make the following statements:

Ann: I am the liar.

Ben: Ann is the liar.

Con: I am not the liar.

Which statement below is true?

- (A) Ann is a liar. / Ann is 'n leuenaar.
(B) Ben is a switcher. / Ben is deurmekaar.
(C) Con is a switcher. / Con is deurmekaar.
(D) Ann is a saint. / Ann is 'n engel.
(E) Con is a saint. / Con is 'n engel.

Vraag 16

'n Gelykbenige driehoek word getrek sodat elkeen van sy punte op 'n sirkel van radius 1 cm lê. Die lengte van die een kant van hierdie driehoek is gelyk aan die deursnee van die sirkel. Wat is die omtrek van hierdie driehoek in cm?

Vraag 17

Twee bote reis agter mekaar in 'n reguit lyn teen konstante spoed. Boot A is aanvanklik 50 meter agter boot B. Na 36 sekondes is boot A egter 20 meter voor boot B. As boot A se spoed 20 km/h is, wat is die spoed van boot B?

Vraag 18

Ann, Ben en Con is drie persone. Een van hulle is 'n leuenaar wat altyd leuens vertel, een is 'n engel en praat altyd die waarheid, terwyl die derde deurmekaar is en partykeer leuens vertel en partykeer die waarheid praat. Hulle maak die volgende bewerings:

Ann: Ek is 'n leuenaar.

Ben: Ann is 'n leuenaar.

Con: Ek is nie 'n leuenaar nie.

Watter bewering hieronder is waar?

Question 19

Johnny has two regular six sided die. He proposes the following game. You roll the two dice. Each time the sum of the two dice is nine, he will pay you R10. However, if the sum is not nine, you must pay him R1. How much money will you win (a positive amount) or lose (a negative amount) on average if you play thirty-six games?

- (A) -R25 (B) -R14 (C) -R3 (D) R8 (E) R19
-

Vraag 19

Johnny het twee gewone seskantige dobbelstene. Hy stel die volgende speletjie voor. Jy rol die twee dobbelstene. Elke keer as die som van die twee dobbelstene nege is, sal hy jou R10 betaal. As die som egter nie nege is nie, moet jy hom R1 betaal. Hoeveel geld sal jy gemiddeld wen ('n positiewe bedrag) of verloor ('n negatiewe bedrag) as jy ses-en-dertig speletjies speel?

Question 20

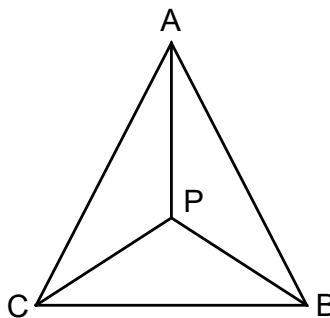
ABC is an equilateral triangle with point P inside it. If $AP = BP = CP = 1$, what is AB?

(Hint: the area of $\triangle ABC$ is equal to three times the area of $\triangle ABP$.)

Vraag 20

ABC is 'n gelyksydige driehoek met punt P in die binnekant. As $AP = BP = CP = 1$, wat is AB?

(Wenk: die oppervlakte van $\triangle ABC$ is gelyk aan drie keer die oppervlakte van $\triangle ABP$.)



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