

MATHEMATICS - ALGEBRA

1. What is the simplest form of

Rahisisha

$$\frac{x - \frac{1}{x}}{1 - \frac{1}{x}} \cdot \frac{x}{x^2 - 1}$$

- A) $\frac{x+1}{x^2+1}$
 B) 1
 C) 2
 D) $\frac{x}{x-1}$

3. Blandina first walked one-third of the distance on a road then one-fourth of the remaining then one-fifth of the remaining after all she was supposed to walk 48 m. What is the total distance?

Blandina alitembea theluthi ya safari, halafu robo ya safari iliyobaki, halafu akatembea moja ya tano ya safari iliyobaki, akawa ametembea m 48. Je safari yote ina urefu gani?

- A) 120m
 B) 240m
 C) 180m
 D) 360m

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2. A chemist has a 75% acid solution and a 25% acid solution. He wants to produce 80l of a 47.5% acid solution. How much of each original solution should he mix?

Mkemia ana asidi yenye 75% na 25%. Anahitaji kutengeneza 80l ya 47.5% ya aside. Je ni kiasi gani cha asidi za mwanzo zitatumika kuchanganyia?

- A) 75% →50l
 25% →30l
 B) 75% →44l
 25% →36l
 C) 75% →30l
 25% →250l
 D) 75% →36l
 25% →44l

4. The rectangular plot whose length is twice the square of the width. The area of the plot is 128 m². What is the perimeter of the plot?

Kiwanja cha mstatili ambacho urefu wake ni mara mbili ya kipeo cha pili cha upana wake. Eneo la kiwanja ni m 128. Nini mzingo wa kiwanja hicho?

- A) 64m
 B) 100m
 C) 32 m
 D) 72m

5. What is the value of a if

Tafuta thamani a kama

$$\frac{3}{2}a + \frac{5}{2}a = 48 + 2a$$

- A) 12
- B) 24
- C) 48
- D) 16

7. Suleiman celebrated his birthday on Wednesday in 2001. Which day of the week was his birthday in 2003?

Suleiman alisherehekea siku yake ya kuzaliwa siku ya Jumatano mwaka 2001. Je ni siku gani katika wiki itakuwa siku yake ya kuzaliwa mwaka 2003?

- A) Sunday (*jumapili*)
- B) Saturday (*jumamosi*)
- C) Friday (*Ijumaa*)
- D) Monday (*jumatatu*)

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6. A doctor's salary was Tsh 4,500,000. After annual increment it is Tsh5,175,000. What is the percentage increment?

Mshahara wa daktari ni Tsh 4,500,000. Baada ya ongezeko la mwaka alipata Tsh5,175,000. Je ongezeko ni asilimia ngapi?

- A) 10
- B) 15
- C) 20
- D) 25

8. Ally can do a work in four days. Ally and Lewis can do in 8/3 days. Lewis and Hamid can do it in 24/7 days. Ally and Lewis work together until they finish half of the work. Then Hamid comes to help them. How long does the whole work take?

Ally ana uwezo wa kufanya kazi kwa siku nne. Ally na Lewis wana uwezo wa kufanya kazi hiyo kwa muda wa siku 8/3. Lewis na Hamid wana uwezo wa kuifanya kazi hiyo kwa siku 24/7. Ally na Lewis wanafanya kazi kwa pamoja na kumaliza nusu ya kazi. Halafu Hamid anaungana nao kuwasaidia. Je kazi itachukua muda gani kumalizika yote?

NUMBER THEORY

9. In how many ways can 61 be written as the sum of two primes?

Kwa namna ngapi 61 inaweza kuandikwa kwa jumla ya namba mbili tasa?

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

10. Which of following integers cannot be written as the sum of four consecutive odd integers?

Namba ipi kati ya zifuatazo ni haiwezi kuandikwa kama jumla ya namba witiri nne zinazofuatana?

- A) 16
- B) 32
- C) 48
- D) 70

11. The number F is a 2- digit number. When F is divided by 9, the remainder is 3. When F is divided by 10, the remainder is 4. What is the remainder when F is divided by 13?

Namba F ni namba yenye tarakimu mbili. Wakati F ikigawanywa kwa 9, inabaki 3. Wakati F ikigawanywa kwa 10, inabaki 4. Je itabaki ngapi wakati F inagawanya 13?

- A) 4
- B) 5
- C) 6
- D) 7

12. On a track for remote controlled racing cars, racing car A completes the track in 28 seconds, racing car B completes the track in 24 seconds and racing car C completes the track in 32 seconds. If they start at the same time from same place, when they meet at the same place again how many times will the track be completed by the racing car A?

Katika mashindano ya kutumia rimoti kukimbiza magari, gari A lilimaliza mzunguko kwa sekunde 24 na gari C lilimaliza mzunguko kwa kutumia sekunde 32. Kama walianza wakati mmoja katika sehemu moja, je watakutana tena muda gani, gari A litakuwa limemaliza mizunguko mingapi?

- A) 24
- B) 28
- C) 32
- D) 672

13. For how many positive even integer values of n are both $\frac{n}{3}$ and $3n$ 3-digit whole numbers?

Kuna namba shufwa ngapi amabzo ni namba nzima zenye taarkimu 3 zenye thamani ya n kati ya $n/3$ na $3n$

- A) 6
- B) 12
- C) 21
- D) 30

14. A palindromic number is a number that is the same when written forwards or backwards. I.e., 121 is a palindromic number. How many do palindromic square numbers have three digits?

Palindromik ni namba ambayo ipo sawa itakapoandikwa kawaida au ukianza nay a mwisho. Mf 121 ni namba ya palindromik. Zipo namba ngapi za Palindromik ambazo kipeo chake cha pili kina tarakimu tatu?

- A) 1
- B) 3
- C) 5
- D) 7

15. John writes down on a board all positive integers from 1 to 50. Then he erases all odd numbers and writes down half of each even number in place of erased odd numbers. How many odd numbers are there on the board?

John aliandika katika ubao namba zote kuanzia 1 hadi 50, halafu akaziondoa namba witiri zote na kuandika nusu ya kila namba shufwa sehemu zote alipoondoa namba witiri. Je kuna namba witiri ngapi zilizopo katika ubao?

- A) 11
- B) 12
- C) 13
- D) 14

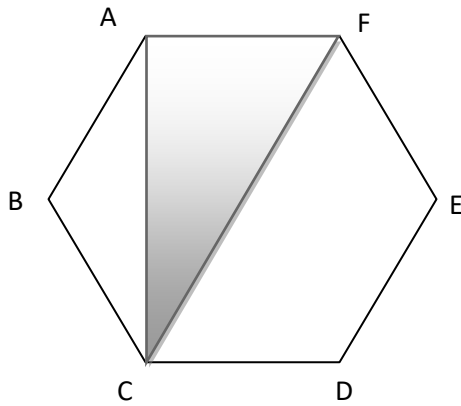
16. The digits 1, 2, 3 and 0 are each used once to write a four digit number $KLMN$. The three digit number KLM is divisible by 4, the three digit number KMN is divisible by 5, and the three digit number LMN is divisible by 3. Find K

Tarakimu 1, 2, 3 na 0 kila moja ilitumika mara moja kuandika namba yenye tarakimu nne $KLMN$. Namba yenye tarakimu tatu KLM inagawanyika kwa 4, na namba yenye tarakimu KMN inagawanyika kwa 5 na namba yenye tarakimu LMN inagawanyika kwa 3. Tafuta thamani ya K

GEOMETRY

17. In the figure ABCDEF is a regular hexagon. $AF=8$ cm. What is the area of $\triangle ACF$?

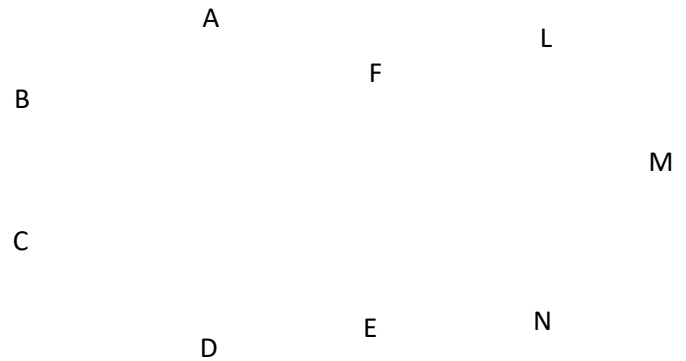
Katika umbo ABCDEF ni pambesita sawa . $AF=8$ cm. Tafuta eneo la $\triangle ACF$?



- A) 32cm^2
- B) $32\sqrt{3}\text{ cm}^2$
- C) 64 cm^2
- D) $64\sqrt{3}\text{ cm}^2$

18. In the figure ABCDEF is regular hexagon and EFLMN is regular pentagon. What is $\angle AFL$?

Katika umbo la ABCDEFni pambesita sawa na EFLMN ni umbo la pentagoni sawa. Tafuta $\angle AFL$



- A) 228°
- B) 166°
- C) 132°
- D) 120°

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19. Three circles with centers A, B, and C and radii 2cm, 3cm and 10 cm are tangent to each other externally. What is the area of ΔABC ?

Duara tatu zenye vitovu A, B na C na nusu vipenyo vya 2cm, 3cm na 10cm ziliungana kwa kwa nje kila moja. Tafuta eneo la ΔABC ?

- A) 30
- B) 40
- C) 50
- D) 60

21. In a square with side length 6cm, four line segments are drawn, the two are connecting midpoints of the sides, the other two are connecting a midpoint with a vertex. What is the area of the shaded region?

Katika mraba wenye upande wa sm 6, mistari minne imechorwa, miwili inaunganisha sehemu za kati za kila upande, na mistari mingine miwili inaunganisha sehemu za kati na pembe. Tafuta eneo lenye kivuli?

- A) 9 cm^2
- B) 8 cm^2
- C) 18 cm^2
- D) 12 cm^2

20. What statement is totally false?

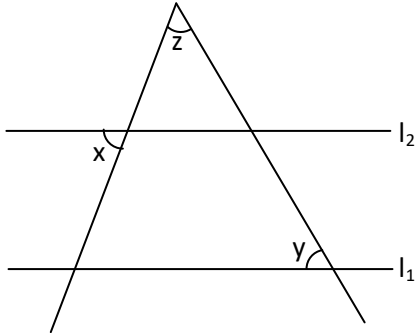
Kauli ipi sio sahihi kabisa?

- A) Sum of an acute angle and an obtuse angle is smaller than 360.
Jumla ya pembe kali na pembe butu ni ndogo kuliko 360.
- B) Sum of two right angles is equal to one straight angle.
Jumla ya pembe mraba mbili ni sawa na pembe mnyoofu
- C) Sum of two acute angles is less than one reflex angle
Jumla ya pembe kali mbili ni ndogo kuliko pembe shamirisho
- D) Difference of an obtuse angle and an acute angle is greater than a straight angle
Tofauti ya butu kali na pembe kali ni kubwa kuliko pembe mnyoofu.

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22. In the figure, l_1 and l_2 are parallel if $x + y = 121^\circ$, then what is z ?

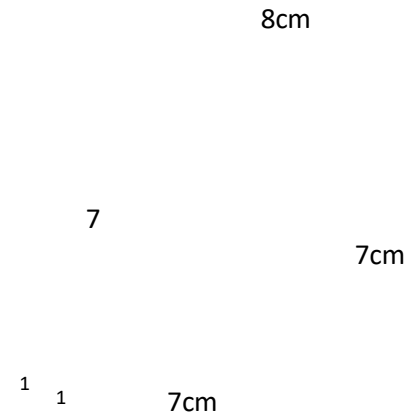
Katika mchoro l_1 na l_2 ziko sambamba ikiwa $x+y=121^\circ$, tafuta z



- A) 72°
- B) 67°
- C) 59°
- D) 50°

23. The volume of the solid is:

Ujazo wa maada ni:



- A) 512cm^3
- B) 500cm^3
- C) 497cm^3
- D) 490cm^3

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24. A cylindrical solid wood with height 10m and radius 2m has been drilled a hollow horizontally right from the center with the radius 1m. What is the surface area of the solid? ($\pi=3$)

Mche duara wa mbao una kimo cha 10m na nusu kipenyo 2m imetengenezwa tobo kwa ulalo kutokea kati na nusu kipenyo 1m. ni eneo la maada? ($\pi=3$)

COMBINATORICS

25. The total weight of a tank is 11 tones when it is full. If the tank is half filled ,then it weighs 6 tones. What is the weight of the tank?

Jumla ya uzito wa tanki ni tani 11 likiwa limejaa.Ikwa lipo nusu uzito wake ni tani 6.Tafuta uzito wa tanki

- A) 1
- B) 2
- C) 3
- D) 4

26. In a chess tournament 4 players play each other exactly once. A game's winner gets 1 point, the loser gets 0. In case of a draw, both players get 0.5 points. Tom lost only one game, but finished last How many points did Tom have?

Kwenye mashindano ya chesi,kila mmoja anacheza na mwenzake mara moja tu katika wachezaji wane.Mshinddi anapata pioni moja na aliyeshindwa anapata 0.Ikiwa watasuluhu wanapata pointi 0.5.Tom alipoteza mchezo mmoja na akamaliza wa mwisho.Tom alipata pointi ngapi?

- A) 0.5
- B) 1
- C) 1.5
- D) 2

27. In a car race, 125 cars enter a100-meter competition. The track has 5 lanes, so only 5 cars can compete at a time. At the end of each race the four non-winners are eliminated, and the winner will compete again in a later race. How many races are needed to determine the champion?

Kwenye mashindano ya magari ,magari 125 yaliingia kwenye mashindano ya mita 100., kwahiyo magari matano ndo yanaweza kumaliza kwa wakati mmoja.kila mwisho wa mashindano magari manne ambayo hayakushinda huondolewa,na mshindi atamaliza tena katika mshindano ya baadae.ni mashindano mangapi yanahitajika kumpata bingwa?

- A) 25
- B) 29
- C) 30
- D) 31

28. A box contains 3 red chips and 2 green chips. Two chips are drawn at random. How many possibilities are there for two chips?

Box lina laini 3 nyekundu na laini 2 za kijani,laini mbili zikichaguliwa bila mpangilio.kuna uwezekano upi kwa hizo laini mbili?

- A) 6
- B) 5
- C) 4
- D) 3

29. How many integers between 100 and 999 have three distinct digits?

Kuna nambari nzima ngapi kati ya 100 na 999 zenye tarakimu tatu zisizo jirudia?

- A) 622
- B) 648
- C) 722
- D) 898

30. In a hexagon (6-sided polygon) ABCDEF, a triangle BDF is drawn. Arafa is coloring the vertices under the condition that no edge will have same colored vertices. What is the minimum number of different colors to be used?

Katika hexagon (umbo lenye pande 6 ABCDEF, Pembe tatu BDF ilichorwa. Arafa anapaka rangi kutengeneza mazigira ya kutokuwepo na kona zenye rangi zinazofanana katika pembe. kwa uchache ni rangi ngapi zitumike?

- A) 6
- B) 5
- C) 4
- D) 3

31. How many parallelograms are there in the figure if two horizontal line segments are parallel to horizontal side and two other lines parallel to side of the triangle on the left?

Ni misambamba mingapi ipo kwenye umbo ikiwa mistari mlalo miwili iko sambamba na mistari mingine miwili sambamba na pande za pambetatu kushoto

- A) 5
- B) 6
- C) 7
- D) 8

32. Aisha has three rabbits to place at the end points of four intersecting line segments as shown in the figure. If a rabbit jumps at once, it will arrive at the intersection point. Is it possible that these rabbits stand at the intersection points which are collinear? Explain your reason

Aisha ana sungura watatu amabao anatakiwa awaweke mwisho wa nukta kwa kila mistari mine itakayo kutana kama inavoonekana kwenye mchoro .ikwa sungura ataruka mara moja atafikia makutano .inawezekana kwa sungura kukutana katika mstari mmoja?



GENIUS-CUP FINAL STANDART 7



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SCIENCE - SAYANSI

1. Which part of the body does not grow in size?

Sehemu gani ya mwili haiongezeki ukubwa

- A) A. Brain (akili)
- B) B. Nose (pua)
- C) C. Eye (jicho)
- D) D. Heart (moyo)

2. The only species of cat that lives and hunts in groups is:

Jamii ya paka ambayo inaishi kwa makundi ni

- A) Lion (simba)
- B) Leopard (chui)
- C) Jaguar (duma)
- D) Puma (puma)

3. What happens when a seed gets too much water?

Nini hutokea mbegu inapopata maji kupita kiasi?

- A) It will rot and will not grow
Itaoza na haitaota
- B) It will multiply
Itaongezeka
- C) It will expand because of the water
Itavimba kwa sababu ya maji
- D) It will grow faster
Itakua kwa haraka

4. The Foetus receives food and air from the mother through

----- hupokea chakula na hewa kutoka kwa mama kwa njia ya

- A) uterus (fuko la vuzazi)
- B) Womb (tumbo la vuzazi)
- C) Placenta (mgi wa mimba)
- D) Fallopian tube (mriga wa uzazi)

5. Which among the animals in diagram below does not lay eggs?

Yupi kati ya wanyama wafuatao hatagi mayai?

A)



B)



C)



D)



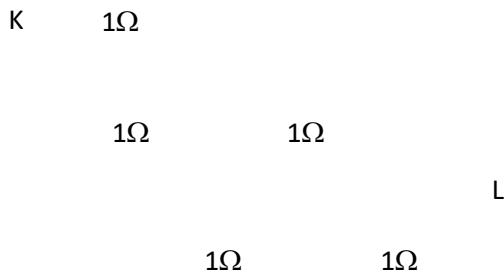
6. **Faeces and decaying bodies of animal and plants;**

Kinyesi na mabaki ya wanyama na mimea;

- A) Makes the soil unsuitable for cultivation
(inafanya ardhi kutokuwa nzuri kwa ukulima)
- B) Invites other insects which destroy crops
(inaruhusu wadudu waharibifu wa mazao)
- C) Add humus to the soil
(inaongeza rutuba katika ardhi)
- D) Are of no importance to the soil
(haina umuhimu katika ardhi)

7. **Calculate the total resistance between K and L.**

Tafuta jumla ya ukinzani kati ya K na L



- A) 1
- B) 3/2
- C) 3
- D) 4

8. **Observe the diagram below carefully what color do you see if you look at green book through blue filter?**

Tazama mchoro hapo chini kwa umakini, rangi gani utaiona kama utatazama kitabu cha kijani kupitia kichujio cha buluu?



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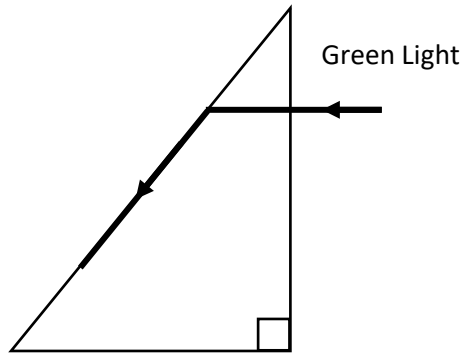


9. **Meteors are always bright because of:**

Vimondo hung'aa kwasababu ya

- A) The light from sun
(mwangaza kutoka katika jua)
- B) The friction of air rubbing against them
(kusafishwa kwa msugvano wa hewa)
- C) The glowing gases they have
(zina gesi inayong'aa)
- D) They are nearer to the sun
(vipo karibu na jua)

10. If the green light follows the way shown after refraction, how do red and violet lights refract?



Kama mwale wa kijani utafuata njia iliyoonyeshwa baada ya refrakisheni, rangi nyekundu na urujuvani zita onekanaje baada ya refrekshen?

- A) Red(nvukundu)
Violet(urujuani)
- B) Red(nyekundu)
Violet(urujuani)
- C) Red(nyekundu)
Violet(urujuani)
- D) Red(nyekundu)
Violet(urujuani)

11. Which one of the following equalities of load is correct?

Ni ipi kati ya milinganyo ya mizingo ifuatayo ni sahihi?

- X
- Y
- Z

- A) $m_x = 2m_y$
- B) $m_y = m_z$
- C) $m_x = m_y$
- D) $2m_z = m_x$

12. A matter has a volume of 15.5 cm^3 and a mass of 62 gr . Calculate the density of this matter.

Kitu kina ujazo wa 15.5 cm^3 na uzani wa 62gm . Tafuta tungamo ya hicho kitu.

- A) 0.025 gr/cm^3
- B) 0.25 gr/cm^3
- C) 4 gr/cm^3
- D) 961 gr/cm^3

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13. **In which pair of energy sources are both renewable sources?**

Jozi ipi ya chanzo cha nishati zote ni nishati endelevu?

- A) Oil and coal
Mafuta na makaa ya mawe
- B) Oil and tidal
Mafuta na mawimbi
- C) Tidal and geothermal
mawimbi na joto la ardhin (nishati joto ya ardhini)
- D) Tidal and nuclear fission
Mawimbi na kupasuka kwa nyuklia

14. **The absorption of vitamin first takes place in the _____.**

Vitamini hufyonzwa kwa mara ya kwanza katika sehemu ipi.....

15. **the part which control the amount of light entering the human eye is _____.**

Sehemu ya jicho la binadamu hudhibiti kiwango cha mwanga unaoingia kwenye jicho ni.....

- A) Pupil (*pupili*)
- B) Iris (*mboni*)
- C) Lens (*lenzi*)
- D) Retina (*retina*)

16. **Which one of the following symptoms is caused by deficiency of iodine mineral is called _____.**

Ipi kati ya yafuatayo husababishwa na upungufu wa madini ya iodine?

- A) Getting bigger stomach and weak leg
(kuwa na tumbo kubwa na kulegea kwa miguu)
- B) Swelling of neck
(Kuvimba shingo (rovu))
- C) Bending of bone
(Kupinda mifupa (matege))
- D) Fast breathing
(Kupumua kwa kasi)

17. **Which one of the following has a definite volume but no definite shape?**

Ipi kati ya ifuatayo ina ujazo maaluma lakini haina umbo maalumu

- A) pen (*kalamu*)
- B) orange juice (*jusi ya chungwa*)
- C) air (*hewa*)
- D) glass (*glasi*)

18. **the muscles found in the human body is an example of:**

Misuli inayopatikana mwilini ni mfano wa;

- A) cell (*seli*)
- B) tissue (*tishu*)
- C) organ (*kiungo*)
- D) system (*mfumo*)

19. Which of the following does not secrete digestive juice?

Ipi kati ya yafuatayo haizalishi juisi ya mmeng'enyoy?

- A) salivary gland (tezi ya mate)
- B) stomach (tumbo)
- C) pancreas (kongosho)
- D) oesophagus (umio)

21. When rain falls, this is because the water vapour in the clouds is condensing into liquid _____.

Mvua inaponyesha, husababisha mvuke katika mawingu hupozwa kuwa kimiminika.....

- A) O₂
- B) H
- C) H₂O
- D) HO

20. Which one of the following organelles is involved in respiration?

Ipi kati ya sehemu ya seli huusika na respiresheni?

- A) nucleus (Kiini)
- B) chloroplast (chemeumbijani)
- C) mitochondria (mitokondiria)
- D) ribosome (ribozomu)

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22. Which is the best way to get salt from salty water?

Ipi ni njia zuri ya kuapata chunvi kutoka maji ya chunvi?