

MARINHA DO BRASIL

SERVIÇO DE SELEÇÃO DO PESSOAL DA MARINHA



**Concurso Público de Admissão ao Colégio Naval
CPACN/2023**

**NÃO ESTÁ AUTORIZADA A UTILIZAÇÃO DE
MATERIAL EXTRA**

1º Dia – Prova de Matemática e Inglês

Questão 1

O dono de uma pastelaria prepara refresco de caju com proporção de uma parte de suco puro para 3 partes de água e o coloca numa refresqueira de volume V . Querendo melhorar a qualidade do produto, experimenta uma nova proporção com 3 partes de suco puro para 7 partes de água e o coloca numa outra refresqueira de mesmo volume V . Como não gostou do resultado e para evitar prejuízo, resolveu misturar os dois conteúdos das refresqueiras num recipiente maior. Assim, é correto afirmar que, após juntar os conteúdos, a porcentagem de suco puro em relação ao volume colocado no recipiente maior é de:

- (A) 26,5%
- (B) 26,8%
- (C) 27,2%
- (D) 27,5%
- (E) 27,8%

Questão 2

Nas últimas eleições, um candidato a deputado encomendou, no início do 2º semestre, 24000 panfletos promocionais para a sua candidatura, em uma determinada gráfica, e combinou com o dono que a entrega seria semanal. Na primeira semana, a gráfica produziu $\frac{1}{4}$ do total da encomenda, tendo sido rejeitado pelo controle de qualidade $\frac{1}{3}$ da produção. Na segunda semana, foram produzidos mais $\frac{2}{5}$ do total da encomenda e rejeitados $\frac{5}{12}$ desse lote. Após a segunda semana, é correto afirmar que a quantidade de panfletos que a gráfica falta produzir para completar a encomenda é um número n , tal que n é:

- (A) múltiplo de 13
- (B) múltiplo de 11
- (C) múltiplo de 7
- (D) quadrado perfeito
- (E) cubo perfeito

Questão 3

Se S é o conjunto solução da equação $\sqrt{x+2} + \sqrt{x+5} + \sqrt{x+8} = \sqrt{x+11}$ no campo dos números Reais e $n(S)$ é a quantidade de elementos do conjunto S , é correto afirmar que $n(S)$ é igual a:

- (A) 0
- (B) 1
- (C) 2
- (D) 4
- (E) 8

Questão 4

Sejam x e y ($x > y$) as medidas das diagonais distintas de um heptágono regular cujo lado tem medida igual a k . Assinale a opção que apresenta de forma correta uma possível relação entre k , x e y .

- (A) $k^2y + kx = xy$
- (B) $k^2y + kx = x^2y$
- (C) $y^2 = xy + k^2$
- (D) $x^2 = ky + kx$
- (E) $x^2 = k^2y - ky$

Questão 5

Três entregadores denominados motoboy ALFA, motoboy BETA e motoboy GAMA trabalham em uma empresa na forma de escalas, em que cada um faz um plantão de 24 horas e descansa 48 horas. Em um determinado ano não bissexto, motoboy BETA estava de serviço no dia 13 de janeiro, motoboy ALFA no dia 17 de janeiro e motoboy GAMA no dia 24 do mesmo mês. Sabendo que não ocorreram faltas ao longo desse ano, é correto afirmar que nos dias 23 de abril, 17 de junho e 21 de agosto, estavam de plantão, respectivamente:

- (A) motoboy ALFA, motoboy BETA e motoboy GAMA.
- (B) motoboy BETA, motoboy GAMA e motoboy ALFA.
- (C) motoboy ALFA, motoboy GAMA e motoboy BETA.
- (D) motoboy GAMA, motoboy BETA e motoboy ALFA.
- (E) motoboy GAMA, motoboy ALFA e motoboy BETA.

Questão 6

Dado o conjunto $A = \{2, 3, 4, 5, 7, 8, 9\}$. Escolhendo-se aleatoriamente 6 elementos distintos do conjunto A , é correto afirmar que a maior média harmônica entre os 6 elementos será obtida quando escolhermos no conjunto dado:

- (A) os 6 menores elementos.
- (B) os 6 maiores elementos.
- (C) os 3 menores elementos e os 3 maiores elementos.
- (D) os 6 elementos que possuem 3 ou menos divisores naturais.
- (E) os 3 elementos pares e os 3 maiores elementos ímpares.

Questão 7

Em uma caixa, há 180 pequenas bolas vermelhas e 230 pequenas bolas azuis. Retiram-se aleatoriamente bolas da caixa que são contadas corretamente e verifica-se então que a quantidade de bolas vermelhas é 70% do total das bolas extraídas. Analise as afirmativas que foram feitas sobre as quantidades de bolas retiradas da caixa e marque a opção correta.

- I - A quantidade de bolas vermelhas é igual a 72.
- II - A razão entre a quantidade de bolas vermelhas e azuis é igual a $\frac{5}{3}$.
- III - A quantidade de bolas azuis é menor do que a metade de bolas vermelhas.

- (A) Apenas as afirmativas I e II estão corretas.
- (B) Apenas a afirmativa II está correta.
- (C) Apenas a afirmativa I está correta.
- (D) Apenas a afirmativa III está correta.
- (E) Apenas as afirmativas II e III estão corretas.

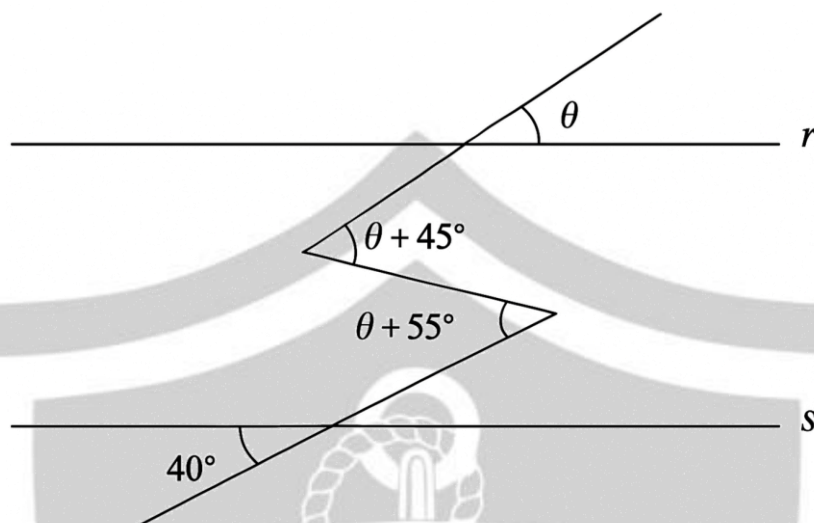
Questão 8

Seja ABC um triângulo cujos lados AB , AC e BC possuem medidas iguais a 14, 12 e 10, respectivamente. Sejam " H " o ortocentro de ABC e " w " a circunferência circunscrita ao triângulo dado. Prolonga-se cada um dos segmentos $\overline{AH}$, $\overline{BH}$ e $\overline{CH}$, até encontrar " w " nos pontos " P ", " Q " e " R ", respectivamente. Assim, de acordo com os dados, a área do hexágono $AQCPBR$, em unidades de área é igual a:

- (A) $24\sqrt{6}$
- (B) $36\sqrt{6}$
- (C) $40\sqrt{3}$
- (D) $24\sqrt{3}$
- (E) $48\sqrt{6}$

Questão 9

Observe a figura abaixo.



Sabendo que na figura acima as retas r e s são paralelas, é correto afirmar que o valor de θ é igual a:

- (A) 45°
- (B) 40°
- (C) 30°
- (D) 25°
- (E) 20°

Questão 10

Ao fazer um passeio turístico pelo rio Paraguai, uma chalana (embarcação comum na região) ancora num determinado ponto P do rio, para propiciar pescaria aos passageiros. Nas margens opostas do rio, encontram-se um posto de abastecimento A e um centro de pesquisa biológica B . Considerando algumas informações conhecidas, como: distância $\overline{AP} = 34,6 \text{ m}$, ângulos $B\hat{A}P = 75^\circ$ e $A\hat{B}P = 45^\circ$, é correto afirmar que a distância, em metros, entre o posto de abastecimento A e o centro de pesquisa B é um número:

- (A) maior do que 20 e menor do que 25.
- (B) maior do que 25 e menor do que 30.
- (C) maior do que 30 e menor do que 35.
- (D) maior do que 35 e menor do que 40.
- (E) maior do que 40 e menor do que 45.

Questão 11

Um sítio com 8 animais tem ração suficiente para 32 dias, e cada animal consome a mesma quantidade de ração diariamente. Após 12 dias, são adquiridos mais 8 animais e cada animal adquirido consome o dobro de ração diária de cada animal que havia anteriormente. Se o estoque de ração não foi renovado, é correto afirmar que ocorrerão problemas de falta de ração no " n -ésimo" dia, tal que n é igual a:

- (A) 16
- (B) 17
- (C) 18
- (D) 19
- (E) 20

Questão 12

Seja ABC um triângulo cujas medidas dos lados $\overline{AB}$, $\overline{AC}$ e $\overline{BC}$ são 8, 15 e 17, respectivamente, e " P " o ponto de tangência do círculo inscrito nesse triângulo sobre o lado $\overline{AB}$, calcule a medida de $\overline{CP}$ e assinale a opção correta.

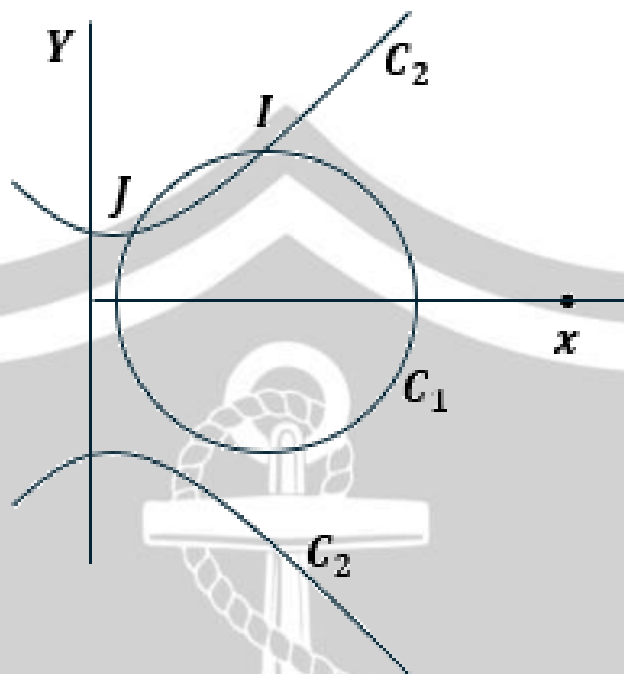
- (A) $2\sqrt{37}$
- (B) $3\sqrt{39}$
- (C) $2\sqrt{29}$
- (D) $6\sqrt{13}$
- (E) $3\sqrt{26}$

Questão 13

Assinale a opção que apresenta o conjunto de todos os valores reais de " x " que solucionam a inequação $\sqrt[3]{x^2 - 1} > x - 1$.

- (A) $] - \infty, 0[\cup] 1, 3[$
- (B) $] - 8, 0[\cup] 1, 8[$
- (C) $] - 8, 8[$
- (D) $] - \infty, +\infty[$
- (E) $] - 2, +\infty[$

Questão 14



Considerando como verdade que a figura acima apresenta no plano cartesiano as curvas C_1 e C_2 (com dois ramos), respectivamente, com equações $C_1: x^2 + y^2 - 8x + 12 = 0$ e $C_2: x^2 - 4y^2 - 6x + 24 = 0$ e que elas se intersectam nos pontos $I(\alpha, \beta)$ e $J(\gamma, \delta)$ com $\alpha > \gamma$, ambos os pontos no primeiro quadrante do plano, e sabendo que, para determinar os pontos de intersecção entre as duas curvas, é necessário resolver o sistema formado por suas respectivas equações, é correto afirmar que $\alpha - \beta$ vale:

- (A) $3/2$
- (B) 2
- (C) $5/2$
- (D) 3
- (E) $7/2$

Questão 15

A quantidade de soluções inteiras da inequação $\frac{1}{x-1} + \frac{1}{(x-2)^2} > 0$ no intervalo $[-10, 50]$ é igual a:

- (A) 40
- (B) 45
- (C) 47
- (D) 48
- (E) 50

Questão 16

As medidas dos catetos de um triângulo retângulo são iguais a K^{2023} e $\frac{1}{K^{2023}}$ onde " K " é um número real positivo. Assinale a opção que apresenta o intervalo com menor valor numérico possível para a hipotenusa.

- (A) $]0, 1[$
- (B) $]1, 2[$
- (C) $]2, 3[$
- (D) $]3, 4[$
- (E) $]4, 5[$

Questão 17

O conjunto solução da equação $x^2 - 5x + 8 - \frac{5}{x} + \frac{1}{x^2} = 0$ no conjunto dos reais é dado por $S = \{x_1, x_2, x_3\}$ com $x_1 \neq x_2 \neq x_3$. Considerando que esses valores x_1, x_2 e x_3 indicam as dimensões de um paralelepípedo reto-retângulo, é correto afirmar que o volume desse paralelepípedo, em unidades de volume, é igual a:

- (A) 8
- (B) 5
- (C) 3
- (D) 2
- (E) 1

Questão 18

Seja $k = 4x$ com $x \in N$ e, $x\%$ de $k + (2k)\%$ de $x - k\%$ de $2x = 4$. É correto afirmar que $\sqrt{k \cdot x}$ escrita na base 3 é igual a:

- (A) $(202)_3$
- (B) $(121)_3$
- (C) $(200)_3$
- (D) $(211)_3$
- (E) $(221)_3$

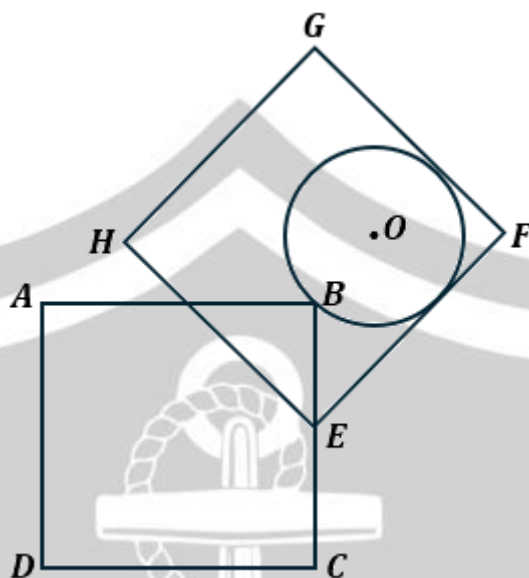
Questão 19

Colocando os números naturais a partir de "1" em fila horizontal, 12345678910111213....; qual o algarismo que ocupará a posição de ordem 1951?

- (A) 7
- (B) 5
- (C) 3
- (D) 2
- (E) 1

Questão 20

Observe a figura abaixo



Seja $ABCD$ um quadrado de lado 8. Se o lado $\overline{BC}$ possui para ponto médio o ponto E , considere o quadrado $EFGH$, congruente ao primeiro, construído de tal forma que o ângulo $\widehat{BEF}$ é igual a 60° . Sabendo que o raio da circunferência que passa pelo ponto B e tangencia os lados $\overline{EF}$ e $\overline{FG}$, como mostra a figura acima, é igual a " x ", é correto afirmar que a equação do segundo grau com coeficiente de x^2 igual a "1", que determina o valor de x , é dada por:

- (A) $x^2 - 2(3 + \sqrt{3})x + 36 = 0$
- (B) $x^2 - 4(3 + \sqrt{3})x + 48 = 0$
- (C) $x^2 - 6(3 - \sqrt{3})x + 40 = 0$
- (D) $x^2 - 8(3 - \sqrt{3})x + 48 = 0$
- (E) $x^2 - 6(3 + \sqrt{3})x + 48 = 0$

Read text I to answer questions 21 to 24.

TEXT I

Japanese company allows pets into the office

The coronavirus pandemic has changed working conditions worldwide. Millions of people have switched from working in their offices to working remotely at home. A Japanese company has initiated a novel measure to entice workers back into the office. The technology giant Fujitsu is allowing some of its workers to bring their pet dogs to work with them. Executives set up an experimental "dog office" at a building some days ago in Kawasaki, near Tokyo. Members of staff are being encouraged to return to the office by bringing their dogs to work. It is part of a trial aimed at making workers more comfortable in the workplace. More people may be willing to give up working remotely from home.

Japan's workforce is renowned for spending long hours in the office. The pandemic greatly changed this. Many workers started working from home. They preferred this new culture of teleworking. They also decided that working remotely was better than enduring two-hour commutes from the suburbs. They got attached to the idea of spending more quality time with their pets. Fujitsu's experiment is an incentive for workers to return to the office and be with their pooches. One worker said he could "communicate with other people with the help of our dogs". Reuters says the Fujitsu "dog office" has space for up to six dogs "and features stain proof carpets and a range of pet supplies".

Adapted from: <https://breakingnewsenglish.com/2209/220926-dog-office.html>

Questão 21

Read the sentence taken from the text.

"Executives set up an experimental "dog office" at a building some days ago [...]."

Mark the option in which the underlined part is in the negative form.

- (A) Executives didn't sat up an experimental "dog office".
- (B) Executives don't set up an experimental "dog office".
- (C) Executives weren't set up an experimental "dog office".
- (D) Executives didn't set up an experimental "dog office".
- (E) Executives don't sat up an experimental "dog office".

Questão 22

According to the text, because of Fujitsu's experiment:

- (A) none of the workers will return to the office.
- (B) a lot of workers can't work remotely at home.
- (C) many workers have to take pet dogs to the office.
- (D) few workers may decide to quit their jobs.
- (E) some workers would prefer to come back to the office.

Questão 23

Read the following sentence taken from the text:

"A Japanese company has initiated a novel measure to entice workers back into the office."

Mark the option that can be a synonym of the verb to entice.

- (A) To prohibit
- (B) To persuade
- (C) To force
- (D) To let
- (E) To implore

Questão 24

Read the statements below and mark the one that is true according to the text.

- (A) In one worker's opinion, dogs may not help humans to communicate.
- (B) Japan's workers are known for working long hours.
- (C) The coronavirus pandemic changed only Japanese working conditions.
- (D) Many workers think that teleworking is worse than working in the office.
- (E) The "dog office" has space for more than six workers' dogs.

Read text II to answer questions 25 and 26.

TEXT II

Itamar Vieira Junior _____ born in Salvador, Bahia, in 1979. Today he _____ a writer and geographer, and _____ a PhD in Ethnic African Studies from UFBA, the Federal University of Bahia. In October 2018, he won Portugal's Leya Prize for his manuscript *Torto Arado* ("Crooked Plough"), published by LeYa Press in 2019. In 2018, he also _____ a finalist for Brazil's Jabuti Prize for his book of short stories, *A oração do carrasco* ("The Executioner's Prayer", Mondrongo, 2017), published with a grant from Bahia's Secretary of Culture. That book won the 2016-2017 Humberto de Campos Prize from the Brazilian Writers' Alliance (Rio de Janeiro section), and second place in the 2018 Bunkyo Literature Prize, awarded by the Brazilian Society for Japanese Culture and Social Assistance. He _____ a columnist for the *São Paulo Review* at the moment.

Adapted from:

<https://wordswithoutborders.org/contributors/view/itamar-vieira-junior/>

Questão 25

According to the following extract, which question does NOT have an answer?

"In October 2018, he won Portugal's Leya Prize for his manuscript *Torto Arado* ("Crooked Plough"), published by Leya Press in 2019."

- (A) When was *Torto Arado* published?
- (B) When did he win the prize?
- (C) What did he win?
- (D) When did he write *Torto Arado*?
- (E) What's the manuscript's name?

Questão 26

Mark the option that best completes the gaps in the text.

- (A) was / is / has / was / is
- (B) was / was / has / was / is
- (C) were / is / has / were / is
- (D) was / was / had / was / is
- (E) were / were / have / is / is

Read text III to answer questions 27 to 30.

TEXT III

Nigeria: young people develop interest in Animation

By Rédaction African news and David Agunloye Taylor.

In Lagos, the commercial centre of the most populous nation in Africa, young people are developing interest in Animation.

Though there is scarcity of formal training opportunities in the animation space, Nigerian animators are carving a niche for themselves by creating local production and short films.

Adebimpe Adebambo is one of the creative directors and animators leading the way. Adebambo is leading the campaign which targets youths or the younger generation to take up animation.

"What I and some of my colleagues have done is that we have started going to schools to start animation clubs. So in that way informally, for some children who want to learn extracurricular skills like photography make up and so on, animation is a choice. We are starting from there". She says.

"There is a lot happening, even we working in the space, some of the jobs we want to work on, we don't have the skill set, we don't have enough people working on it." Adebambo added.

A stop motion Animator and Creative Director at Radioxity Media, Esther Gbadamosi, says animation can also be a way for the younger generation to express themselves.

"When we go out and we tell young people about animation, it's to say look there is a path here. A lot of people have a story to tell. Animation is an expressive platform. Stop motion, 3D does not require that much. You just need to be able to put yourself together. Sometimes you may just need a PC and things like that which are things that our young people are getting and probably just using for social media."

For trainees like Ronald Adeniyi, the autonomy of character creation is what sparked his interest.

"I am familiar with 2d, 3d and 3d max animation. Nothing fantastic about them, but for Stop animation you can actually create your own characters that is the most fascinating thing for me."

For many of these animators, the dream is to see a Nigeria where there are many young creatives passionate about the art and producing films to great local and international acclaim.

Adapted from: <https://www.africanews.com/2022/03/26/nigeria-young-people-develop-interest-in-animation/>

Questão 27

According to text III, what does Esther say about animation?

- (A) It's difficult for young people to work with stop motion animation.
- (B) There's nothing fantastic about the animation space.
- (C) There are many Nigerian animators producing internationally acclaimed films.
- (D) Animation is a way to express opinions and feelings.
- (E) It's necessary to start animation clubs in schools.

Questão 28

Read the following sentence taken from the text and rewrite the underlined part.

"In Lagos, the commercial centre of the most populous nation in Africa, young people are developing interest in Animation."

- (A) Africa most populous' nation
- (B) Africa most's populous nation
- (C) Africa's most populous nation
- (D) Africa most populous's nation
- (E) Africa's most populous's nation

Questão 29

Read the following sentence taken from the text.

"Nothing fantastic about them, but for Stop animation you can actually create your own characters that is the most fascinating thing for me."

According to the text, the underlined words respectively refer to:

- (A) 2d, 3d and 3d max animation / Ronald Adeniyi
- (B) your own characters / Ronald Adeniyi
- (C) for trainees / Esther Gbadamosi
- (D) Ronald and Esther / David Agunloye
- (E) Esther and David Agunloye / Ronald Adeniyi

Questão 30

Choose the correct option according to the text.

- (A) Nigerian animators are leading a campaign because there are many formal training opportunities in the animation space.
- (B) Some animators are going to schools to start animation clubs unless some children want to learn extracurricular activities.
- (C) Young people are more interested in animation in order to start animation clubs in schools.
- (D) There aren't enough formal training opportunities in the animation space but Nigerian animators are creating local production and short films.
- (E) Adebimpe Adebambo is leading a campaign so that the younger generation can learn extracurricular skills like photography.

Questão 31

Read the sentence and choose the best option to complete the gaps.

“ _____ from the University of Bern in Switzerland have shown that it is possible to learn new _____ while we are sleeping _____.”

Taken from: <https://breakingnewsenglish.com/1902/190206-learning-vocabulary.html>

- (A) Researchers / information / deeply
- (B) Researchers / misinformation / deep
- (C) Research / informative / deeply
- (D) Research / informer / deepen
- (E) Researching / informatively / deepening

Questão 32

Read the sentences below and choose the one that is correct.

- (A) The woman which came to the door left flowers for you.
- (B) Any person that identification is not up to date won't come on board.
- (C) The town which I grew up is important to me.
- (D) I have an uncle in Bahia who won the lottery.
- (E) My brother Jim, that lives in London, is a teacher.

Questão 33

All the options can substitute the underlined part keeping a similar idea EXCEPT.

Discrimination against people with mental health problems is common.

- (A) often happens
- (B) usually happens
- (C) generally happens
- (D) hardly ever happens
- (E) frequently happens

Questão 34

Read the paragraph below.

Slavery still exists. The United Nations says about 50 million people are enslaved today. They are in forced labour or marriages. The U.N. said one in 150 people in the world is enslaved. This number increased by 20 per cent in the past few years. It is growing because of coronavirus, climate change, and the cost of living crisis. These have made many people poor. They can only survive by working in terrible conditions having an unwanted marriage.

Adapted from: <https://breakingnewsenglish.com/2209/220915-modern-slavery-1.html>

Choose the option which defines the underlined nouns as U (uncountable) or C (countable).

- (A) (C)-(C)-(C)-(U)
- (B) (U)-(C)-(U)-(C)
- (C) (U)-(C)-(C)-(C)
- (D) (C)-(C)-(U)-(C)
- (E) (C)-(U)-(U)-(C)

Questão 35

Mark the sentence which is grammatically correct.

- (A) I left my toy under the bed.
- (B) My mom is of the kitchen.
- (C) My brother left his jacket in the chair.
- (D) He wants to live on Brazil.
- (E) My birthday is on September.

Questão 36

Read the cartoon.



Adapted from <http://pt.jikos.cz/garfield/2004/>

Jon chose to use going to because he decided to invite his friends:

- (A) to ask for help.
- (B) before he spoke to Garfield.
- (C) to give an order.
- (D) at the time of speaking.
- (E) to make it possible.

Questão 37

Which sentence is grammatically correct?

- (A) The most easiest sport in the world is soccer.
- (B) The most richer person in the world lives in the USA.
- (C) The stronger animal in the planet is the elephant.
- (D) The better city to live is Rio de Janeiro.
- (E) The nicest guy in town proposed to me.

Questão 38

Which option expresses an order?

- (A) Elizabeth, you can borrow my book.
- (B) Karen, you might stay at home tonight.
- (C) Carlos, you should apply for that job.
- (D) David, you must stop playing games.
- (E) Bob, go home and clean your bedroom.

Questão 39

Which sentence shows an unreal situation?

- (A) If you don't water the plant, the plant dies.
- (B) If there was a fire, we wouldn't escape.
- (C) If you wouldn't have a cat, you weren't happy.
- (D) If you are studying, you'd pass the exam.
- (E) If you are a doctor, your mom will be proud of you.

Questão 40

Read the dialogue:

Jon: The movie might not be good enough to win an Oscar.

Julia: Come on, Jon!! The special effects are amazing.

What's the idea expressed by might in the sentence?

- (A) Permission.
- (B) Obligation.
- (C) Prohibition.
- (D) Possibility.
- (E) Ability.

Gabarito

Matemática

- 1- D
- 2- D
- 3- A
- 4- C
- 5- Anulada
- 6- B
- 7- D
- 8- E
- 9- C
- 10- B
- 11- D
- 12- E
- 13- A
- 14- B
- 15- D
- 16- B
- 17- E
- 18- A
- 19- Anulada
- 20- B

Inglês

- 21- D
- 22- E
- 23- B
- 24- B
- 25- D
- 26- A
- 27- D
- 28- C
- 29- A
- 30- D
- 31- A
- 32- D
- 33- D
- 34- B
- 35- A
- 36- B
- 37- E
- 38- E
- 39- B
- 40- D