

MARINHA DO BRASIL

SERVIÇO DE SELEÇÃO DO PESSOAL DA MARINHA



**Concurso Público de Admissão ao Colégio Naval
CPACN/2020**

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

1º Dia – Prova de Matemática e Inglês

Questão 1

Seja A o conjunto de todos os valores reais de x, tais que $\sqrt{(x-2)^2} > x-2$. É correto afirmar que:

- (A) A é todo o conjunto dos Reais
- (B) $A =]2, +\infty[$
- (C) $A =]-\infty, 2[$
- (D) $A =]-2, +\infty[$
- (E) $A =]-2, 2[$

Questão 2

Observe a figura a seguir



Ela esboça o percurso de um atleta amador, que partiu do ponto A e fez um trajeto que tem uma subida e uma descida. Ele chegou ao ponto B e retornou pelo mesmo caminho, seguindo o sentido oposto, onde o que era descida passou a ser subida e o que era subida passou a ser descida, finalizando no ponto de partida A. Sabendo que ele desenvolve uma velocidade média de 8km/h na subida e uma velocidade média de 12km/h na descida e que gastou 1h e 30m na ida e 1h 45m na volta, é correto afirmar que o percurso total corrido por ele em quilômetros é igual a:

- (A) 30,8
- (B) 31,2
- (C) 32,6
- (D) 34,4
- (E) 35,2

Questão 3

Suponha que durante a pandemia uma distribuidora de medicamentos tivesse estoque de álcool gel com distribuições diárias iguais, suficiente para atender 18 farmácias durante 64 dias. Após 16 dias, 6 farmácias fecharam e, passados mais 17 dias, a distribuidora aceitou um pedido do governo para que atendesse a mais 10 farmácias. As farmácias fechadas não irão abrir mais. É correto afirmar que a partir do dia em que aceitou o pedido do governo a distribuidora terá estoque suficiente para atender a todas as farmácias durante:

- (A) 26 dias.
- (B) 28 dias.
- (C) 30 dias.
- (D) 32 dias.
- (E) 34 dias.

Questão 4

Quantos são os valores distintos de n , para os quais $102 \leq n \leq 202$, e n é a quantidade de lados de um polígono convexo cuja soma dos ângulos internos resulta num quadrado perfeito?

- (A) 2
- (B) 4
- (C) 6
- (D) 8
- (E) 9

Questão 5

Sejam a , b e c números reais positivos com $a+b > c$ considere também que $a^2 - b^2 - c^2 + 2bc + a + b - c = 21$ e que simultaneamente $a^2 + b^2 + c^2 + 2ab - 2ac - 2bc = 9$. Um estudante fatorou os primeiros membros das igualdades e encontrou uma relação sempre verdadeira entre a , b e c . Assinale a opção que apresenta essa relação.

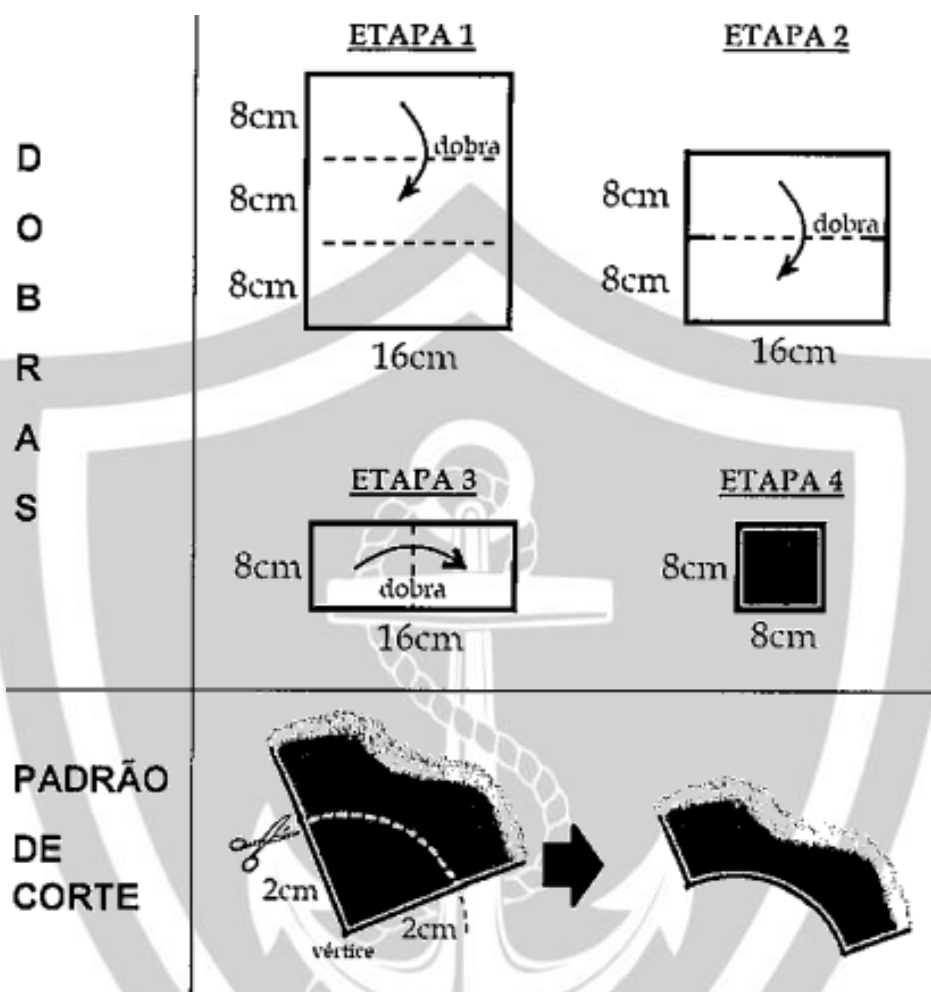
- (A) $a + b = c + 1$
- (B) $b - a = c - 6$
- (C) $a - c = 4 - b$
- (D) $c - a = b - 2$
- (E) $b - c = a + 4$

Questão 6

Considere o triângulo ABC acutângulo e não equilátero, onde O é o seu circuncentro e H o seu ortocentro. A reta que passa por O e H intersecta o lado AB no ponto P , e a reta que passa por C e H intersecta o mesmo lado AB no ponto Q . Se a reta suporte de HP é a bissetriz do ângulo $\widehat{AHQ}$ e o segmento $HP = 4\text{cm}$, é correto afirmar que medida em cm do perímetro do triângulo AHP é igual a:

- (A) $4 + 2\sqrt{3}$
- (B) $4 + 3\sqrt{2}$
- (C) $4 + 6\sqrt{3}$
- (D) $8 + 4\sqrt{2}$
- (E) $8 + 4\sqrt{3}$

Questão 7

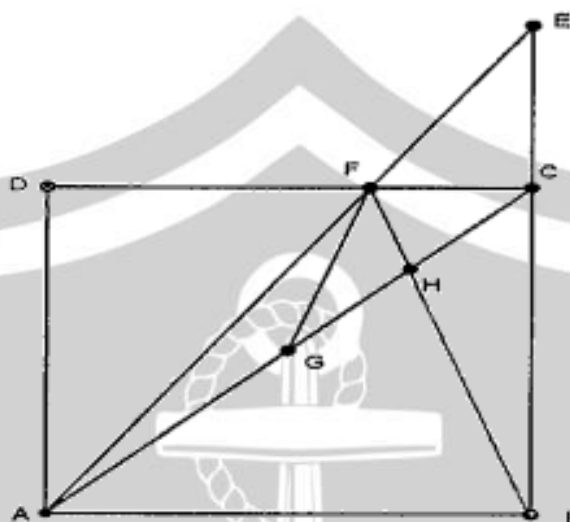


A figura apresenta o passo a passo de uma folha retangular, 24 cm x 16 cm, que será dobrada e depois cortada. Tanto as etapas das dobras como a maneira que a folha será cortada após essas dobras estão indicadas na figura. Ao final da última etapa de dobras, visto de cima, o aspecto do papel é de um quadrado 8 cm x 8 cm. Dois vértices desse quadrado são escolhidos para serem retirados; visto de cima, cada corte é um arco de circunferência de 90° , que tem centro nesse vértice e raio 2 cm. Considere $\pi = 3$ e determine a área da folha desdobrada que sobrou após os cortes.

- (A) 348
- (B) 354
- (C) 360
- (D) 366
- (E) 372

Questão 8

Observe a figura a seguir:



Ela apresenta um quadrado ABCD com lado medindo 2 unidades de comprimento(u.c). Sabe-se que G é o centro desse quadrado e que $\overline{CE} = 1\text{u.c}$ é o prolongamento do lado $\overline{BC}$. Se s_1 é a área do triângulo FHC e s_2 é a área do triângulo FHG, é correto afirmar que a razão $\frac{s_1}{s_2}$ é igual a:

- (A) 7/8
- (B) 8/9
- (C) 9/10
- (D) 1
- (E) 6/5

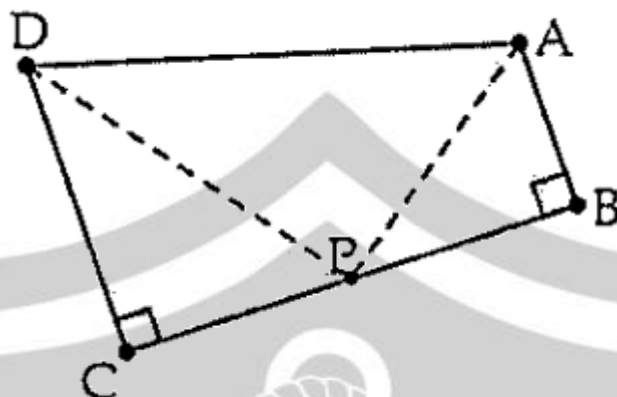
Questão 9

Uma prova de língua estrangeira foi aplicada aos $\frac{7}{8}$ dos alunos matriculados numa turma em um dia em que não houve presença total dos matriculados. Nesse dia o número de alunos na turma que falava fluentemente inglês era 12 a menos do que o número daqueles que não falavam fluentemente inglês. Após a correção da prova foi constatado o seguinte: a média aritmética de todas as notas dos alunos presentes foi 7,2. Todos os alunos que falavam fluentemente inglês obtiveram nota 9,2 e todos os alunos que não falavam fluentemente inglês obtiveram nota 6,4. É correto afirmar que o total de alunos matriculados nessa turma é um número cuja soma dos algarismos vale:

- (A) 5
- (B) 8
- (C) 11
- (D) 12
- (E) 13

Questão 10

Observe a figura a seguir.



Ela apresenta um trapézio retângulo com bases AB e CD. Sabe-se também que as bissetrizes internas com vértices em A e em D do lado BC, se intersectam em P. Sendo assim, analise as afirmações a seguir.

- (i) $\widehat{APD} = 90^\circ$
- (ii) $BP = CP$
- (iii) $AD^2 = BP^2 + CP^2$
- (iv) $AD = AB + CD$

São verdadeiras:

- (A) i, ii e iii apenas
- (B) i, ii e iv apenas
- (C) i, iii e iv apenas
- (D) ii, iii e iv apenas
- (E) i, ii, iii e iv.

Questão 11

Ao efetuar o cálculo da expressão com potência $4^n - 7^{2020}$ variando n, número natural diferente de zero, e usando um moderno computador, um estudante encontrou diversos números K como resposta. Sem o uso de recurso eletrônico é possível estabelecer quais os algarismos das unidades que ele pode ter encontrado para o módulo de K. Ao efetuar a multiplicação de todos os algarismos das unidades possíveis para o módulo de K obtém-se produto igual a:

- (A) 15
- (B) 36
- (C) 84
- (D) 105
- (E) 135

Questão 12

A soma e o produto das raízes x_1 e x_2 de uma equação do 2º grau são iguais. Se s é a soma das raízes da equação, é correto afirmar que a expressão $x_1^2 + x_2^2 + \frac{s^2}{x_1^2} + \frac{s^2}{x_2^2}$ é igual a:

- (A) $s^2 - 4s$
- (B) $s^2 - 8s$
- (C) $4s^2 - 16s$
- (D) $2s^2 + 8s$
- (E) $2s^2 - 4s$

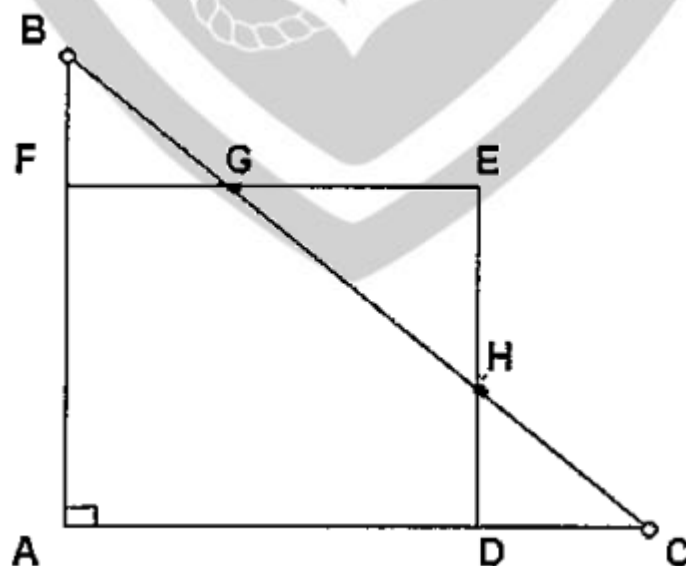
Questão 13

Uma pizza de 40 cm de diâmetro foi dividida corretamente em 16 fatias iguais. Uma segunda pizza de 30 cm de diâmetro foi dividida corretamente em 25 fatias iguais. Uma menina comeu 3 fatias da primeira pizza ingerindo o seu quinhão (o que cabe ou deveria caber em uma pessoa ou coisa) x enquanto um homem adulto comeu 12 fatias da segunda pizza ingerindo o seu quinhão y . Quantas fatias da segunda pizza uma mulher adulta deverá comer para que o quinhão ingerido por ela seja igual a média geométrica entre x e y , considerando $\pi = 3$ e a variação das espessuras das pizzas desprezível?

- (A) 5
- (B) 6
- (C) 9
- (D) 10
- (E) 11

Questão 14

Observe a figura a seguir:

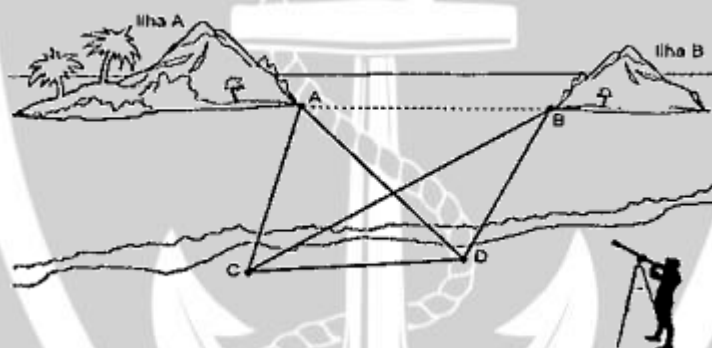


Na figura, ABC é um triângulo retângulo de catetos p e q e hipotenusa s, ADEF é um quadrado de lado unitário com vértice E externo ao triângulo ABC. Utilizando p, q e s para representar a soma $\overline{FG} + \overline{DH}$ obtém-se:

- (A) $q + s - \frac{p^2}{q^2}$
 (B) $q + s + \frac{p^2}{4sq}$
 (C) $q + s - \frac{p^2}{sq}$
 (D) $q - s + \frac{p^2}{2sq}$
 (E) $q - s - \frac{p}{sq}$

Questão 15

Observe a figura a seguir



Um geógrafo posicionado numa praia deseja determinar a distância entre duas ilhas e para isso toma como referência os pontos A e B das ilhas como mostra a figura. Na praia ele marca dois pontos C e D distantes 70m um do outro. Usando um medidor de ângulos (teodolito), os ângulos $\widehat{ACB} = 38^\circ$, $\widehat{BCD} = 37^\circ$, $\widehat{ADC} = 60^\circ$ e $\widehat{ADB} = 53^\circ$. É correto afirmar que a distância entre os pontos A e B é:

Dados $\sin 37^\circ = 3/5$, $\sin 75^\circ = 19/20$, $\cos 53^\circ = 3/5$ e $\sqrt{2} = 7/5$

- (A) maior do que 70m e menor do que 75 m.
 (B) maior do que 75m e menor do que 80 m.
 (C) maior do que 80m e menor do que 85 m.
 (D) maior do que 85m e menor do que 90 m.
 (E) maior do que 90m e menor do que 95 m.

Questão 16

Considerando os resultados das expressões A e B até a 4ª casa decimal sem fazer aproximações e sabendo-se que:

$$A = \frac{(11\% \text{ de } 25) + 36\% \text{ de } (75 \times 3\% \text{ de } 50)}{(24\% \text{ de } 35) - (8\% \text{ de } 40)} = 8, a1b3e \text{ e } B = \frac{(75\% \text{ de } 36 \times 50\% \text{ de } 3) + (25\% \text{ de } 11)}{(35\% \text{ de } 24) - (40\% \text{ de } 8)} = c, 3d7e$$

, determine o resto da divisão de N por 11 sendo o número $N = (a + b)^{c+d+e}$

- (A) 0
- (B) 1
- (C) 4
- (D) 7
- (E) 9

Questão 17

Seja $A = \{(x, y) \in \mathbb{R}^* \times \mathbb{R}^* | 17(x^2 + y^2) = 30xy\}$, é correto afirmar que:

- (A) $A = \emptyset$.
- (B) existem 7 elementos distintos no conjunto A.
- (C) A é um conjunto infinito.
- (D) A é um conjunto unitário.
- (E) existem 8 subconjuntos próprios de A.

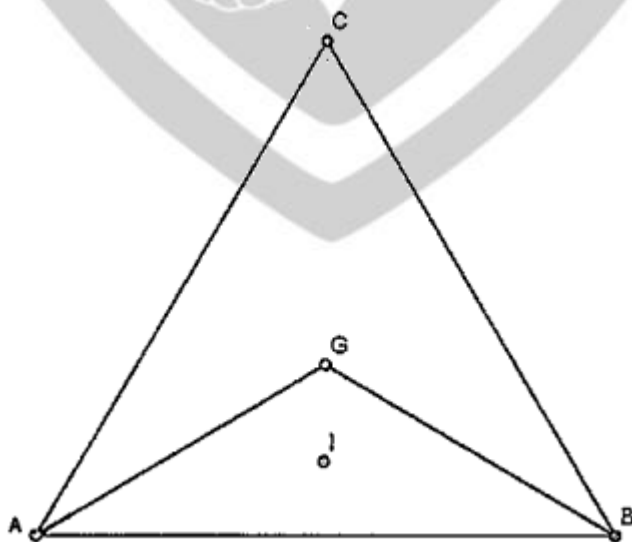
Questão 18

Considere o conjunto $A = \left\{x \mid x = \frac{1}{n+1}, n \in \mathbb{N}\right\}$ um subconjunto da reta. É correto afirmar que:

- (A) existe um único elemento de A cuja distância a qualquer outro elemento, também de A, é inferior a qualquer número real positivo.
- (B) zero é um elemento do conjunto A.
- (C) fixado qualquer valor real positivo p, sempre existirão dois elementos do conjunto A cuja distância na reta real é menor do que p.
- (D) existe um elemento do conjunto A que não é racional.
- (E) existem dois elementos do conjunto A, de tal modo que a diferença entre eles não é um número racional.

Questão 19

Observe a figura a seguir.

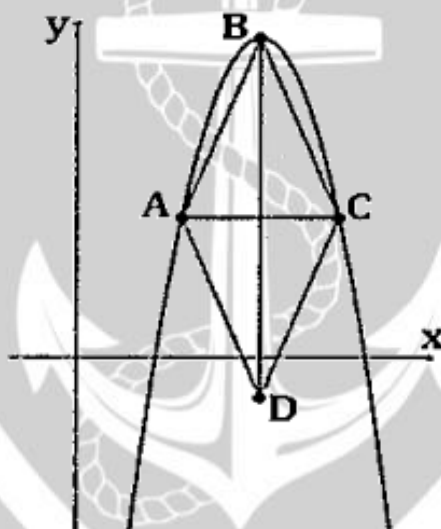


Na figura temos um triângulo equilátero ABC de baricentro G e o triângulo ABG cujo incentro é I. É correto afirmar que o suplemento do ângulo $\widehat{GAI}$ em radianos é igual a:

- (A) $\frac{7\pi}{9}$
- (B) $\frac{5\pi}{6}$
- (C) $\frac{8\pi}{9}$
- (D) $\frac{9\pi}{10}$
- (E) $\frac{11\pi}{12}$

Questão 20

Observe a figura a seguir.



Na figura, a parábola é a representação gráfica no plano cartesiano da função $y = -x^2 + 14x - 33$. Sabe-se, sobre o losango ABCD de diagonais AC e BD, com AC paralelo ao eixo de x e BD paralelo ao eixo de y, que o produto das abscissas dos vértices A e C é igual a 40 e que o vértice B é o ponto de ordenada máxima da função. É correto afirmar que a área do losango em unidades de área é igual a:

- (A) 72
- (B) 64
- (C) 60
- (D) 54
- (E) 48

Read text I to answer questions 21 to 22.

TEXT I

The South Korean movie "Parasite" _____ (WIN) the Oscar for best picture on Sunday, which means that it was the first non-English language movie to win the top prize.

It also was the first movie from South Korea to get a nomination at the Oscars. Before the Oscars, "Parasite" also won awards at the Cannes Film Festival, the Screen Actors Guild, and the British Academy of Film and Television Arts.

Director Bong Joon-ho said that the movie is "a continuation of all the Korean films that came before. It's an extension of our history." The movie is about class struggles between the rich and poor.

14-02-2020

Adapted from: <https://www.newslevels.com/>

Questão 21

Mark the option that best completes the gap in the text with the right form of the verb in brackets.

- (A) wins
- (B) has won
- (C) was winning
- (D) is winning
- (E) won

Questão 22

According to the text:

- (A) the movie Parasite addresses the subject of social issues.
- (B) Parasite received a lot of nominations but didn't win anything.
- (C) other non-English language movies have already won the Oscar.
- (D) other South Korean movies got different nominations at the Oscars.
- (E) Parasite is a trilogy about the story of South Korea directed by Bong Joo-ho.

Read text II to answer questions 23 to 30.

Coronavirus: Venice Carnival closes as Italy imposes lockdown

23 February 2020

Italian officials have cut short the Venice Carnival as they try to control what is now the worst outbreak of the coronavirus in Europe.

Authorities in the Veneto region said the event would end later on Sunday, two days earlier than scheduled. Italy has by far the highest number of coronavirus cases in Europe, with 152. Three people have died. Italy has imposed strict quarantine restrictions in two northern "hotspot" regions close to Milan and Venice.

About 50,000 people cannot enter or leave several towns in Veneto and Lombardy for the next two weeks without special permission. Even outside the zone, many businesses and schools have suspended activities, and sporting events have been cancelled. The BBC's Mark Lowen described the situation just outside the zone. In neighbouring Austria, a train from Venice was stopped at the Austrian border after it emerged that

two passengers had fever symptoms. Austria's Interior Minister Kari Nehammer later confirmed to the BBC that the pair tested negative for coronavirus.

"All authorities have acted quickly and with great caution in this case," said Mr Nehammer in a statement. "The reporting chain worked without delay."

Elsewhere, authorities in South Korea and Iran are battling to control rising numbers of infections. South Korea has raised its coronavirus alert to the "highest level".

The new strain of coronavirus, which originated last year in Hubei province in China, causes a respiratory disease called Covid-19. China has seen more than 76,000 infections and 2,442 deaths.

What is happening in Italy?

Prime Minister Giuseppe Conte announced on Saturday that "extraordinary measures" would come into force to try to stem the rising number of coronavirus cases. He said the quarantine restrictions could last for weeks. Police, and if necessary the armed forces, will have the authority to ensure the regulations are enforced.

Angelo Borrelli, the head of Italy's Civil Protection Department, told reporters that 110 of the confirmed cases were in Lombardy, with 21 in Veneto with others in Emilia Romagna and Lazio. Officials reported a third death on Sunday, an elderly woman from the town of Crema suffering from cancer. Italian officials say they are still trying to trace the source of the outbreak.

Universities in Milan have been closed and the city's mayor, Giuseppe Sala, said schools would also close their doors while the outbreak continued. "As a precaution I think that the schools have to be closed in Milan. I will propose to the president of the region to enlarge the precaution to the entire metropolitan city area. It is just a precaution, we don't want to create panic," he said.

Meanwhile Giorgio Armani's fashion show, scheduled to be held _____ (I) Milan _____ (II) Sunday, went ahead but without any media or buyers present. The show was livestreamed _____ (III) its website, Instagram and Facebook pages.

Adapted from: <https://www.bbc.com/news/world-europe51602007>

Questão 23

When was Carnival supposed to finish in Venice?

- (A) Late on Sunday.
- (B) On Tuesday.
- (C) After the quarantine.
- (D) On Wednesday.
- (E) After two weeks.

Questão 24

Mark the sentence from the text that contains the use of Present Continuous.

- (A) "Three people have died."
- (B) "The reporting chain worked without delay."
- (C) "He said the quarantine restrictions could last for weeks."
- (D) "Officials reported a third death on Sunday, an elderly woman from the town of Crema suffering from cancer."
- (E) "Italian officials say they are still trying to trace the source of the outbreak."

Questão 25

Mark the option that best completes gaps I, II and III in the text with the right preposition.

- (A) on / in / at
- (B) in / on / on
- (C) at / of / in
- (D) on / on / on
- (E) in / on / of

Questão 26

According to the text:

- (A) a train was stopped at the Austrian border because there were two people contaminated with the coronavirus.
- (B) Italy is now the country with more cases on coronavirus worldwide.
- (C) "extraordinary measure" announced by Mr. Conte include enforcement of the regulations by the population.
- (D) Italian authorities haven't discovered the origin of the coronavirus in Italy yet.
- (E) cities and regions outside the zone are closing universities and schools because they are in panic.

Questão 27

Read the following sentence taken from the text.

"Italian officials have cut short the Venice Carnival as they try to control what is now the worst outbreak of the coronavirus in Europe."

Mark the adjective that forms its Superlative the same way as the underlined word.

- (A) High.
- (B) Good.
- (C) Early.
- (D) Elderly.
- (E) Extraordinary.

Questão 28

Read the following sentence taken from the text.

"All authorities have acted quickly and with great caution."

Mark the option that contains a sentence with the same type of adverb underlined in the sentence above.

- (A) John looked around but he couldn't see the monkey.
- (B) He is probably in the park.
- (C) The water was extremely cold.
- (D) He swims well.
- (E) I will call you later.

Questão 29

Read the following sentence taken from the text.

"Even outside the zone, many businesses and schools have suspended activities, and sporting events have been canceled."

All the underlined words are considered Countable nouns. Mark the option in which all the nouns are considered Uncountable.

- (A) beauty, computer, strawberry, diary
- (B) money, painting, window, love
- (C) electricity, advice, help, oxygen
- (D) cookie, candy, fruit, shop
- (E) knowledge, idea, man, air

Questão 30

Which regions in Italy are suffering the most with the corona virus outbreak?

- (A) Austria and South Korea.
- (B) South Korea and Iran.
- (C) Milan and Venice.
- (D) Veneto and Lombardy.
- (E) Emilia-Romagna and Lazio.

Read text III to answer questions 31 to 33.

Six thousand couples decided not to let the coronavirus deter them from celebrating their happy day. The multiple brides and grooms attended a mass wedding ceremony in South Korea's Unification Church on Friday, in spite of the health scare from the coronavirus in neighbouring China. The newlyweds were joined by 24,000 guests; some renewing their marriage vows and others watching friends and family tie the knot. The church seemed well prepared for such a large-scale event as staff handed out hand sanitizer and surgical masks to all attendees. They also checked the temperature of the couples.

Adapted from: <https://breakingnewsenglish.com/2002/200211-masswedding.html>

Questão 31

Who do the underlined possessive adjectives "their" in the text refer to, respectively?

- (A) coronavirus / countries.
- (B) celebrate / marriage vows.
- (C) brides / couples.
- (D) grooms / newlyweds.
- (E) couples / guests.

Questão 32

All pairs of words are usually related to a wedding, except:

- (A) happy day / tie the knot.
- (B) brides / grooms.
- (C) sanitizer / surgical masks.
- (D) couples / newlyweds.
- (E) marriage vows / guests.

Questão 33

What happened last Friday, according to the text?

- (A) Friends and families watched couples preparing the church to a big event.
- (B) Twenty-four thousand people went to China to get married, despite the coronavirus threat.
- (C) Thousands of people got married and renewed their marriage vows in South Korea.
- (D) Newlyweds and their guests went to South Korea to check their health condition.
- (E) Thousands of people canceled their wedding ceremony due to the coronavirus threat

Read text IV to answer questions 34 to 37.

Meditation: A simple, fast way to reduce stress

Meditation can wipe away the day's stress, bringing with it inner peace. See how you can easily learn to practice meditation whenever you need it most.

By Mayo Clinic Staff

If stress has you anxious, tense and worried, consider trying meditation. Spending even a few minutes in meditation can restore your calm and inner peace.

Anyone can practice meditation. It's simple and inexpensive, and it doesn't require any special equipment.

And you can practice meditation wherever you are - whether you're out for a walk, riding the bus, waiting at the doctor's office or even in the middle of a difficult business meeting.

Meditation has been practiced for thousands of years. Meditation originally was meant to help deepen understanding of the sacred and mystical forces of life. These days, meditation is commonly used for relaxation and stress reduction.

Meditation is considered a type of mind-body complementary medicine. Meditation can produce a deep state of relaxation and a tranquil mind.

During meditation, you focus your attention and eliminate the stream of jumbled thoughts that may be crowding your mind and causing stress. This process may result in enhanced physical and emotional well-being.

Benefits of meditation

Meditation can give you a sense of calm, peace and balance that can benefit both your emotional well-being and your overall health.

And these benefits don't end when your meditation session ends. Meditation can help carry you more calmly through your day and may help you manage symptoms of certain medical conditions.

Adapted from: <https://www.mayoclinic.org/testsprocedures/meditation/in-depth/meditation/art-20045858>

Questão 34

Read the sentence below.

"Meditation can give you a sense of calm, peace and balance."

Mark the option that indicates the correct question for the sentence above.

- (A) What do you do during meditation?
- (B) What are the benefits of meditation?

- (C) Why meditation is good for you?
(D) What benefits do meditation have?
(E) Does meditation have benefits?

Questão 35

Read the sentence below.

"During meditation, you focus your attention and eliminate the stream of jumbled thoughts."

The adjective "jumbled" (underlined in the sentence) can be replaced without change in meaning by:

- (A) good.
(B) awful.
(C) useless.
(D) enjoyable.
(E) disordered

Questão 36

According to the text, meditation is:

- (A) expensive.
(B) mystical.
(C) jumbled.
(D) simple.
(E) difficult.

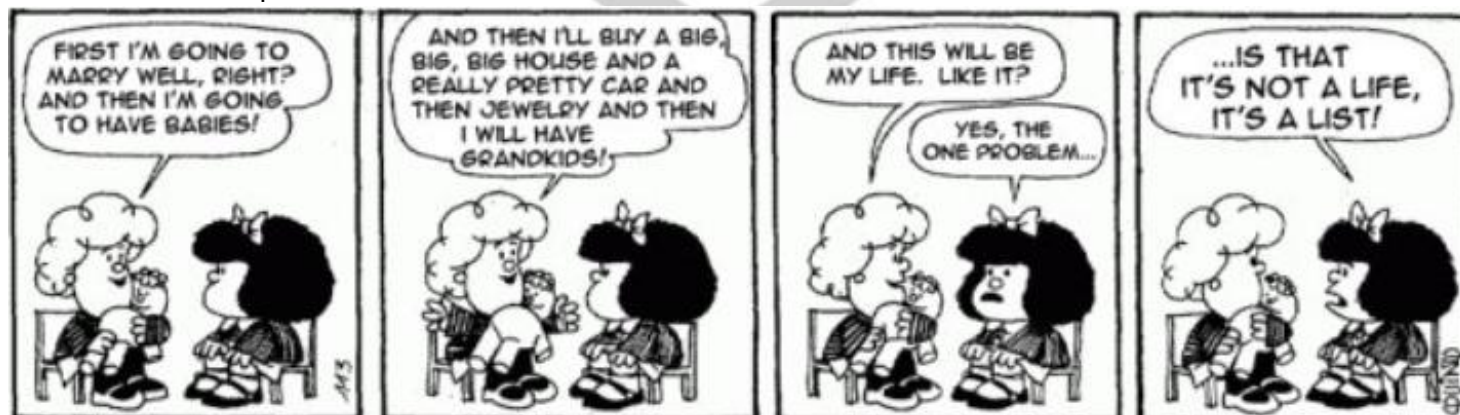
Questão 37

Mark the correct option according to the text.

- (A) People use meditation to relief their stress.
(B) Meditation can be considered a medical procedure.
(C) In the past, meditation was used only for relaxation and stress.
(D) Nowadays, meditation helps deepen understanding of the sacred life.
(E) It's important to keep meditating all the time to maintain oneself calm and relaxed.

Questão 38

Read the comic strip below.



Mark the correct sentence that explains the comic strip.

- (A) Mafalda has great plans for Susanita's future.
- (B) Susanita makes future plans for Mafalda as a to-dolist.
- (C) Mafalda thinks that planning one's future as a to-dolist is a great idea.
- (D) Mafalda realizes that her future plans are exact the same as Susanita's.
- (E) Mafalda thinks that Susanita should not focus on trying to achieve social expectations.

Questão 39

Read the sentence below.

He feels like eating a lot of ice cream on Friday.

Change the sentence to Simple Past tense and negative form. Then, mark the correct option.

- (A) He didn't fell like eating a lot of ice cream last Friday.
- (B) He didn't felt like eating a lot of ice cream last Friday.
- (C) He didn't feel like eating a lot of ice cream last Friday.
- (D) He didn't like eating a lot of ice cream last Friday.
- (E) He didn't fall like eating a lot of ice cream last Friday.

Questão 40

Read the dialogue below.

John: "I am about to fall asleep. I need to stay awake!"

Katie: "I _____ you some coffee."

Complete the dialogue with the right option.

- (A) 'll go
- (B) 'm going get
- (C) 'll get
- (D) 'm go get to
- (E) 'll to go to get

Gabarito

Matemática

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

Inglês

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