

SOAL DAN PEMBAHASAN OSN MATEMATIKA SMA 2013

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Soal dan Pembahasan OSN Matematika SMA 2013

Soal 1:

Diketahui fungsi $f(x) = x^3 - 3x^2 + 2x + 1$. Tentukan nilai minimum dan nilai maksimum fungsi $f(x)$ pada interval $[0, 2]$.

Pembahasan 1:

1. Cari turunan pertama dari $f(x)$: $f'(x) = 3x^2 - 6x + 2$
2. Tentukan titik kritis dengan mencari nilai x yang membuat $f'(x) = 0$:
 - $3x^2 - 6x + 2 = 0$
 - $(3x - 1)(x - 2) = 0$
 - $x = 1/3$ atau $x = 2$
3. Evaluasi nilai $f(x)$ pada titik kritis dan titik batas interval:
 - $f(0) = 1$
 - $f(1/3) = 2,429$
 - $f(2) = 3$
4. Nilai minimum adalah 1 dan nilai maksimum adalah 3.

Soal 2:

Tiga buah lingkaran dengan jari-jari 1 cm, 2 cm, dan 3 cm disusun sedemikian rupa sehingga lingkaran yang paling kecil berada di dalam lingkaran yang lebih besar dan

seterusnya. Tentukan luas daerah yang tidak termasuk dalam lingkaran mana pun.

Pembahasan 2:

1. Luas daerah yang tidak termasuk dalam lingkaran terkecil adalah luas lingkaran tengah dikurangi luas lingkaran terkecil: $\pi(2^2) - \pi(1^2) = 3\pi \text{ cm}^2$
2. Luas daerah yang tidak termasuk dalam lingkaran tengah adalah luas lingkaran besar dikurangi luas lingkaran tengah: $\pi(3^2) - \pi(2^2) = 5\pi \text{ cm}^2$
3. Luas daerah yang tidak termasuk dalam lingkaran mana pun adalah jumlah dari kedua luas daerah di atas: $3\pi + 5\pi = 8\pi \text{ cm}^2$.

Soal 3:

Terdapat 5 bilangan bulat positif yang berbeda. Jumlah dari 3 bilangan terkecil adalah 15, sedangkan jumlah dari 3 bilangan terbesar adalah 21. Tentukan jumlah dari kelima bilangan tersebut.

Pembahasan 3:

1. Misalkan bilangan-bilangan tersebut adalah a, b, c, d , dan e , dengan $a < b < c < d < e$.
2. Dari informasi yang diberikan, kita memiliki:
 - $a + b + c = 15$
 - $d + e + c = 21$
3. Jumlah dari kelima bilangan tersebut adalah:
 - $a + b + c + d + e = (a + b + c) + (d + e + c)$
 - $= 15 + 21$
 - $= 36$

Soal 4:

Diberikan fungsi $g(x) = (x - 1)(x^2 - 2x + 3)$. Tentukan nilai minimum dari $g(x)$ pada interval $[-1, 3]$.

Pembahasan 4:

1. Cari turunan pertama dari $g(x)$: $g'(x) = 3x^2 - 8x + 4$
2. Tentukan titik kritis dengan mencari nilai x yang membuat $g'(x) = 0$:
 - $3x^2 - 8x + 4 = 0$
 - $(3x - 2)(x - 2) = 0$
 - $x = 2/3$ atau $x = 2$
3. Evaluasi nilai $g(x)$ pada titik kritis dan titik batas interval:
 - $g(-1) = -2$
 - $g(2/3) = -1,944$
 - $g(2) = 0$
 - $g(3) = 8$
4. Nilai minimum adalah $-2,944$, yang terjadi pada $x = 2/3$.

Soal 5:

Terdapat sebuah kubus dengan panjang rusuk 10 cm. Pada setiap titik sudut kubus dibuat sebuah bola dengan diameter 4 cm. Tentukan volume bagian kubus yang tidak termasuk dalam bola-bola tersebut.

Pembahasan 5:

1. Volume kubus adalah $10^3 = 1000 \text{ cm}^3$.
2. Volume satu bola adalah $\frac{4}{3}\pi(2^3) = 33,49 \text{ cm}^3$.
3. Volume 8 bola adalah $8 \times 33,49 = 267,92 \text{ cm}^3$.
4. Volume bagian kubus yang tidak termasuk dalam bola-bola tersebut adalah
 $???? \text{ kubus} - \text{volume 8 bola} = 1000 \text{ cm}^3 - 267,92 \text{ cm}^3 = 732,08 \text{ cm}^3$.

Top Body Menu: The Ultimate Guide to Downloading and Exploring

What is Top Body Menu?

Top Body Menu is a comprehensive software suite designed for bodybuilders and fitness enthusiasts. It offers a vast array of tools and resources to help users track their progress, monitor their health, and optimize their workouts. From nutrition planning to exercise logging, Top Body Menu provides everything you need to reach

your fitness goals.

Can I download Top Body Menu for free?

Yes, Top Body Menu offers a free version that allows users to access a limited set of features. The free version includes basic nutrition tracking, exercise logging, and progress graphs. For access to more advanced features, such as personalized meal plans, workout programs, and body analysis tools, you can purchase a premium subscription.

How do I download Top Body Menu?

To download Top Body Menu, simply visit the official website at topbodymenu.com. From there, select the "Download" option and follow the instructions provided. The software is available for Windows, Mac, iOS, and Android devices.

Is Top Body Menu easy to use?

Top Body Menu is designed to be user-friendly and intuitive. The interface is clean and straightforward, making it easy to navigate and find the tools you need. The software also provides detailed tutorials and help resources to guide you through the various features.

What are the benefits of using Top Body Menu?

Top Body Menu offers numerous benefits for bodybuilders and fitness enthusiasts, including:

- Accurate nutrition tracking and personalized meal planning
- Comprehensive exercise logging and workout analysis
- Detailed body composition analysis and progress monitoring
- Access to expert nutrition and fitness advice
- A supportive community of like-minded individuals

The Singing Butler: Exploring Jack Vettriano's Enigmatic Paintings

Known for his captivating paintings that evoke a sense of mystery and intrigue, Jack Vettriano has created a collection of iconic works that have gained widespread

recognition. Among these, "The Singing Butler" stands out as one of his most famous and sought-after prints.

What is "The Singing Butler"?

"The Singing Butler" is a painting by Jack Vettriano that depicts a butler in a tuxedo standing in front of a vanity table. He is wearing a mask over his eyes and holds a microphone in one hand, while the other hand rests on a woman's purse. The woman, seen only from behind, is sitting at the vanity table, her head tilted back in laughter.

What is the Significance of the Painting?

"The Singing Butler" has become one of Vettriano's most recognizable works due to its enigmatic atmosphere. The masked butler and the laughing woman create a sense of mystery and intrigue, leaving viewers to speculate about the nature of their relationship and the events that led to this moment.

What are the Key Elements of the Painting?

The painting is characterized by Vettriano's signature style, which blends elements of surrealism and realism. The use of vibrant colors and detailed brushstrokes creates a rich and evocative composition. The masked butler's presence adds a touch of the uncanny to the scene, while the woman's laughter suggests a sense of joy and liberation.

What is the Meaning of "The Singing Butler"?

Vettriano has never explicitly revealed the meaning behind "The Singing Butler," leaving it open to interpretation. Some viewers see it as a commentary on social conventions and the hidden desires that lie beneath the surface. Others believe it is a celebration of the power of music and the joy of letting go.

Where Can I Find "The Singing Butler" Prints?

Original paintings by Jack Vettriano are highly sought-after and can command significant prices. However, prints of his works, including "The Singing Butler," are more accessible and widely available. You can find "The Singing Butler" prints at art

galleries, online retailers, and specialized art dealers who handle Vettriano's work.

Sentieri di Finale: 45 Percorsi Scelti tra Borgio Verezzi, Finale Ligure e Capo Noli

The "Sentieri di Finale" is a collection of 45 carefully curated hiking trails that wind through the breathtaking landscapes of Liguria, Italy, connecting the picturesque towns of Borgio Verezzi, Finale Ligure, and Capo Noli. These trails offer a diverse range of experiences, from easy strolls along the coast to challenging ascents through verdant forests.

Q: What is the total length of the Sentieri di Finale trails? A: The total length of the trails is approximately 165 kilometers, providing hikers with ample opportunities for exploration.

Q: Are the trails suitable for all levels of hikers? A: Yes, the Sentieri di Finale trails are designed to accommodate a range of abilities, with some trails specifically marked for easy walking, while others offer more strenuous challenges for experienced hikers.

Q: What types of terrain can hikers expect on these trails? A: The trails traverse a variety of terrains, including coastal paths along the Mediterranean Sea, lush forests, rocky cliffs, and rolling hills, providing hikers with a diverse and visually stunning experience.

Q: Are there any notable landmarks or attractions along the trails? A: Yes, the trails pass by several notable landmarks, including the scenic Marina di Varigotti, the historic town of Noli, and the medieval village of Verezzi, offering hikers opportunities to discover the region's rich history and culture.

Q: Where can hikers find more information about the Sentieri di Finale trails? A: Detailed information about the trails, including maps, descriptions, and GPX tracks, is available on the official website: www.sentieri-finale.it. Hikers can also find additional resources at local tourist information centers or through organized hiking groups.

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