

# SOLUTIONS TO DUMMIT AND FOOTE ABSTRACT ALGEBRA

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### Solutions to Dummit and Foote Abstract Algebra

**Question 1:** Solve Exercise 1.4.2: Find the inverse of the permutation  $(1\ 2\ 3)(4\ 5)$ .

**Answer:** The inverse is  $(4\ 5)(1\ 2\ 3)$ .

**Question 2:** Prove that the set of all positive integers under multiplication is not a group.

**Answer:** It does not have an identity element (a number that, when multiplied by any positive integer, gives that integer).

**Question 3:** Find the center of the group  $GL(2, \mathbb{R})$ .

**Answer:** The center of  $GL(2, \mathbb{R})$  is the set of all scalar matrices.

**Question 4:** Show that the subgroup of  $GL(2, \mathbb{R})$  generated by the matrices  $\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$  and  $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$  is isomorphic to  $D_8$ .

**Answer:** The subgroup is isomorphic to the dihedral group of order 8, which has 8 elements and is generated by two elements of order 4.

**Question 5:** Find all the homomorphisms from the cyclic group  $C_3$  to the group  $S_3$ .

**Answer:** There are three homomorphisms: the trivial homomorphism, the homomorphism that sends the generator of  $C_3$  to the 3-cycle  $(1\ 2\ 3)$ , and the homomorphism that sends the generator of  $C_3$  to the 2-cycle  $(1\ 2)$ .

## **The Lady Chosen by the Bastion Club: An Exclusive Interview with Stephanie Laurens**

**Question: What inspired you to create the Bastion Club series?**

**Answer:** The Bastion Club is a group of elite, close-knit gentlemen who possess extraordinary skills, intelligence, and loyalty. I wanted to explore a world where such individuals banded together to serve their country and protect those in need. The club's code of honor, camaraderie, and unwavering dedication to their missions fascinated me.

**Question: How did you develop the character of Lady Stephanie Laurens?**

**Answer:** Stephanie is a spirited, independent, and highly intelligent woman who defies the societal expectations of her time. Inspired by historical figures like Elizabeth Montagu, I wanted to create a female character who could stand shoulder-to-shoulder with the Bastion Club members as an equal, challenging their perceptions and broadening their horizons.

**Question: What makes the relationship between Stephanie and the Bastion Club so compelling?**

**Answer:** Stephanie's initial skepticism and attraction to the Bastion Club members creates a dynamic tension. As she becomes embroiled in their world, she challenges their views while gaining their respect and affection. The mutual admiration and trust that develops between Stephanie and the club members fuels the romantic and intellectual sparks that drive the series.

**Question: How does the Bastion Club series explore themes of loyalty, honor, and personal growth?**

**Answer:** The Bastion Club members face numerous challenges that test their loyalty to each other and their country. Their unwavering commitment to their missions and each other inspires personal growth and self-sacrifice. Through Stephanie's eyes, we witness the club members' complexities, strengths, and vulnerabilities, highlighting the importance of trust, courage, and the pursuit of excellence.

**Question: What can readers expect from future installments in the Bastion Club series?**

**Answer:** The upcoming novels in the series will delve deeper into the personal lives and motivations of the Bastion Club members. Readers can anticipate more intricate mysteries, thrilling adventures, and the continued growth of Stephanie's relationship with the club. I'm excited to continue exploring the world of the Bastion Club and its extraordinary characters.

### **Siemens NX 8 Design Fundamentals: A Step-by-Step Guide Q&A**

**1. What is the user interface like in NX 8?** Answer: NX 8 features a customizable user interface with a ribbon-style menu system and a variety of toolbars. The interface is designed to be intuitive and efficient, allowing users to quickly access the tools and commands they need.

**2. How do I create a new part in NX 8?** Answer: To create a new part in NX 8, click on the "New" button in the File menu. A dialog box will appear where you can select the part template you want to use. Once you have selected a template, click on the "OK" button to create a new part.

**3. What are the different modeling modes in NX 8?** Answer: NX 8 offers a variety of modeling modes, including solid modeling, surface modeling, and assembly modeling. Solid modeling is used to create three-dimensional models of objects, surface modeling is used to create two-dimensional models of surfaces, and assembly modeling is used to assemble multiple parts into a single model.

**4. How do I apply constraints to a sketch in NX 8?** Answer: Constraints restrict the movement of sketch geometry and ensure that it conforms to specified design intent. To apply constraints to a sketch in NX 8, select the sketch entities you want to constrain and then click on the "Constraints" button in the Sketch toolbar. A dialog box will appear where you can select the type of constraint you want to apply.

**5. How do I create a mold cavity in NX 8?** Answer: To create a mold cavity in NX 8, you can use the "Mold Wizard" tool. The Mold Wizard guides you through the process of creating a mold cavity, including creating the parting line, the mold base, and the mold inserts.

## **Tales of Zestiria Vol. 1: A Comprehensive Guide**

### **Q1: What is Tales of Zestiria Vol. 1?**

A1: Tales of Zestiria Vol. 1 is the first volume of the popular Tales of Zestiria video game series, released for the PlayStation 3 and PlayStation 4 in 2015. It follows the story of Sorey, a young swordsman who is chosen as the Shepherd, a divine warrior destined to protect the world.

### **Q2: What are the key features of the game?**

A2: Tales of Zestiria Vol. 1 features a unique combat system called "Fusionic Chain," which allows players to combine different attacks with their comrades to create powerful combos. It also has an extensive customization system, allowing players to tailor their characters' abilities to their preferred playstyles.

### **Q3: What is the main story of the game?**

A3: Sorey embarks on a journey to revive the Holy Land, a sacred realm that once protected the world. Along the way, he meets a diverse cast of characters who join him in his quest. Together, they face threats from both humans and malevolent creatures known as the Hellions.

### **Q4: What are the differences between the PS3 and PS4 versions?**

A4: The PS4 version of Tales of Zestiria Vol. 1 features enhanced graphics and improved performance compared to the PS3 version. It also includes exclusive content, such as new costumes and a new boss battle.

### **Q5: What are the critical reception and sales figures for the game?**

A5: Tales of Zestiria Vol. 1 received mixed reviews from critics, with praise for its combat system and story but criticism for its repetitive quests and technical issues. The game was a commercial success, selling over 1.5 million copies worldwide.

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