Week 12 Assignment
The due date for submitting the assignment (one page) is due on 2021-06-14, 21:59 IST. As per our records you have not submitted this assignment.

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1. Select the correct option:
   - There are no circles of radius r in a grid
   - Every grid is a field, but every field is not a grid
   - (a,b) is an example of a field
   - None of the option are correct
   - The answer is incorrect.
   - Accepted Answers:
     - There are no circles of radius r in a field

2. Which of the following in the SCED (secondary common elements) of the following polynomials over \( R \) the field of rational numbers \( \mathbb{Q} \) with \( a + 1 \) and \( a - 1 \):
   - \( a^2 + 1 \)
   - \( a^2 - 1 \)
   - \( p(x) \)
   - None of the given options
   - No answer is incorrect.
   - Accepted Answers:
     - \( a^2 + 1 \)

3. Which of the following best suits a toy:
   - A degree polynomial over fields will always have no roots
   - A monic polynomial of degree 3 is a polynomial of x in which the coefficient of the highest power is equal to unity
   - \( f(x) \) is a polynomial over \( \mathbb{Q} \), then \( f(x) \) is a root of itself
   - An irreducible polynomial over a field cannot be factored as a product of two non-constant polynomials
   - No, the answer is incorrect.
   - Accepted Answers:
     - A degree polynomial over fields will always have no roots

4. Which of the following is true:
   - \( (x^2 + 1)(x^2 - 1) \)
   - \( (x^2 + 1)(x^2 - 1) \)
   - \( (x + 1)(x - 1) \)
   - None of the given options
   - No answer is incorrect.
   - Accepted Answers:
     - \( (x^2 + 1)(x^2 - 1) \)

5. Determine the character of the fields \( f(x) \) are respectively:
   - \( \mathbb{Q}(i), \mathbb{Q}(j) \)
   - \( \mathbb{Q}(i), \mathbb{Q}(j) \)
   - \( \mathbb{Q}(i), \mathbb{Q}(j) \)
   - None of the given options
   - No answer is incorrect.
   - Accepted Answers:
     - \( \mathbb{Q}(i), \mathbb{Q}(j) \)

6. If a ring \( R \) is a ring under addition and multiplication with \( S \), then:
   - \( S \) is a ring under addition and multiplication with \( R \) but not when \( S = R \)
   - \( S \) is a ring under addition and multiplication with \( S \) but not with \( R \)
   - None of the given options
   - No answer is incorrect.
   - Accepted Answers:
     - \( S \) is a ring under addition and multiplication with \( S \) but not with \( R \)

7. Which of the following polynomials are irreducible in \( \mathbb{Q}[x] \):
   - There are no 5th degree irreducible quadratics in \( \mathbb{Q}[x] \)
   - There are no 5th degree irreducible quadratics in \( \mathbb{Q}[x] \)
   - There are 5th degree irreducible quadratics in \( \mathbb{Q}[x] \)
   - None of the given options
   - No answer is incorrect.
   - Accepted Answers:
     - There are 5th degree irreducible quadratics in \( \mathbb{Q}[x] \)

8. Which of the following polynomials are irreducible in \( \mathbb{Q}[x] \):
   - There are no 8th degree irreducible quadratics in \( \mathbb{Q}[x] \)
   - There are 8th degree irreducible quadratics in \( \mathbb{Q}[x] \)
   - None of the given options
   - No answer is incorrect.
   - Accepted Answers:
     - There are 8th degree irreducible quadratics in \( \mathbb{Q}[x] \)

9. Alice and Bob of some remaining friends each have a to-be-sharer, Alice wishes to reconstruct the secret and ask her friends to send her their secret shares. However, a friend sent Alice incorrect values in an attempt to stop her from learning the secret. Note that Alice does not know which shares are incorrect. Choose the correct option(s):
   - Alice can detect that some shares are incorrect when \( n \geq 10 \) and \( x = 1 \)
   - Alice can detect that some shares are incorrect when \( n = 10 \) and \( x = 1 \)
   - Alice can detect that some shares are incorrect when \( n = 10 \) and \( x = 1 \)
   - None of the given options
   - No answer is incorrect.
   - Accepted Answers:
     - Alice can detect that some shares are incorrect when \( n = 10 \) and \( x = 1 \)

10. Suppose that the election committee of a college consists of three students and three professors. The result of election is an anonymous key. That key is distributed between the six members. It is decided that the following combinations only can unlock the result:
   - All of the three students together only.
   - All of the three professors together only.
   - Two students and one professor together only.
   - The correct statement is:
   - No, the answer is incorrect.
   - Accepted Answers:
     - Two students and one professor together only.

11. Consider the following statements about a group $G$:
   - Each 20th statement is false
   - If $a$ is in $G$, then $a^2$ is in $G$
   - If $a$ is in $G$, then $a^2$ is in $G$
   - Which of the following is true about the group $G$?
   - No answer is incorrect.
   - Accepted Answers:
     - Each 20th statement is false

12. Consider the following statements about a group $G$:
   - (a) $a$ is in $G$
   - (b) $a^2$ is in $G$
   - (c) $a^3$ is in $G$
   - Which of the following is true about the group $G$?
   - No answer is incorrect.
   - Accepted Answers:
     - All options are true