Single Choice 3

1. Let R be an integral domain and $p \in R$. Which of the following statements is not equivalent to the others?

(a) p is prime.

(b) R/pR is an integral domain.

(c) p is irreducible.

(d) All the statements above are equivalent to each other.

2. Which of the following statements is false?

(a) $(\mathbb{Z}[X])^* = \mathbb{Z}^*$

(b) $(\mathbb{Z}[i][X])^* = (\mathbb{Z}[i])^*$

(c) $(\mathbb{Z}/7\mathbb{Z}[X])^* = (\mathbb{Z}/7\mathbb{Z})^*$

(d) $(\mathbb{Z}/9\mathbb{Z}[X])^* = (\mathbb{Z}/9\mathbb{Z})^*$

3. Which of the following polynomials is reducible in $\mathbb{Q}[X]$?

(a) $X^5 - 4X + 22$

(b) $7x^4 + 25X^2 + 15X - 10$

(c) $2X^4 + 3X^3 + 3X^2 - 4$

(d) $5X^5 - 6X^4 + 12X^3 - 6$

4. The polynomial $X^4 + 4X + 1$ is

(a) reducible in $\mathbb{Q}[X]$.

(b) irreducible in $\mathbb{Q}[X]$.

5. Which of the following statements is true?

(a) 7 is irreducible and prime in $\mathbb{Z}[\sqrt{-13}]$.

(b) 7 is irreducible but not prime in $\mathbb{Z}[\sqrt{-13}]$.

(c) 7 is neither irreducible nor prime in $\mathbb{Z}[\sqrt{-13}]$.

(d) 7 is prime but not irreducible in $\mathbb{Z}[\sqrt{-13}]$.