The Discriminant

Multiple Choice

1. $$3x^2 + 23x - 13 = 0$$

    How many distinct real solutions does the given equation have?
    A) Exactly one
    B) Exactly two
    C) Infinitely many
    D) Zero

2. If the quadratic equation $x^2 - kx + 25 = 0$ has one real solution, which of the following is a possible value of k?
    A) -15
    B) -5
    C) 0
    D) 10

3. Which of the following most accurately describes the roots of $3x^2 + 3x + 1 = 0$?
    A) Exactly one
    B) Exactly two
    C) Infinitely many
    D) Zero

4. For what values of c does the equation $x^2 + cx + 4 = 0$ have no real solutions?
    A) All $c < 0$
    B) All $c < 4$
    C) $0 < c < 4$
    D) $-4 < c < 4$

5. $$y = x^2$$
    $$px + qy = -z$$

    In the above system of equations, p, q, and z are integers. For which of the following will there be more than one real solution for the system?
    A) $p^2 + 4qz > 0$
    B) $q^2 - 4pz < 0$
    C) $p^2 - 4qz > 0$
    D) $q^2 + 4pz < 0$

Grid-In

6. How many real solutions does the equation $-4x^2 - x + 3 = 0$ have?

7. $$4x^2 + bx + 169 = 0$$

In the given equation, b is a positive integer. The equation has one real solution. What is the value of b?

8. $$-x^2 + 5x + k = 0$$

In the given equation, k is a constant. One of the solutions can be written as $\frac{1}{2}(5 - \sqrt{53})$. What is the value of k?

9. If the quadratic equation $-9x^2 + kx - 441 = 0$ has one real solution, what is the value of k, where k is a positive integer?

10. $$-x^2 + bx - 625 = 0$$

In the given equation, b is a positive integer. The equation has no real solutions. What is the greatest possible value of b?